ORDER NO. SD8004-1726

Service Manual

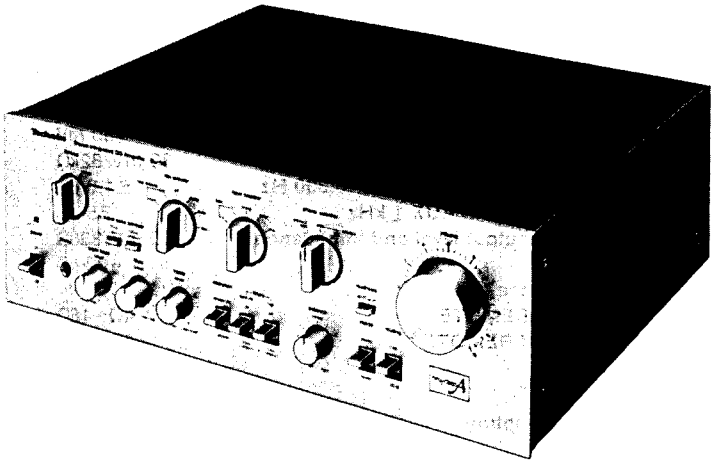
Stereo Integrated DC Amplifier

SU-V8

[D], [DG], [EB], [XE], [XSW], [XGH], [XGF], [XAL], [XA]

SU-V8(K)

[D], [DG], [EB], [XE], [XSW], [XGH], [XAL], [XA]



, in
black color and silver type.
The black type model is provided with (K) in the Service Manual.

Areas

* [D] and [DG] are available in Scandinavia and European except Belgium, United Kingdom, Switzerland, Holland and France.
* [EB] is available in Belgium.
* [XE] is available in United Kingdom.
* [XSW] is available in Switzerland.
* [XGH] is available in Holland.
* [XGF] is available in France.
* [XAL] is available in Australia.
* [XA] is available in Asia, Latin America, Middle East and Africa.

■ CONTENTS

	Page
TECHNICAL SPECIFICATIONS	1～3
LOCATION OF CONTROLS	4, 5
OUTLINE OF THIS UNIT	5, 6
TECHNICAL INSTRUCTIONS	7, 8
DISASSEMBLY INSTRUCTIONS	8, 9
ADJUSTING INSTRUCTIONS (ENGLISH)	10
EINSTELLUNGSANWEISUNGEN (DEUTSCH)	10, 11
INSTRUCTIONS DE REGLAGE (FRANÇAIS)	11, 12
ADJUSTING POINTS	12
PRECAUTIONS FOR REPAIR	13
VARIABLE RESISTORS	13
BLOCK DIAGRAM	14
REPLACEMENT PARTS LIST (Electric Parts)	15
BLOCK DIAGRAM OF IC'S	15
PRINTED CIRCUIT BOARD	16～21
TERMINAL GUIDE OF TRANSISTOR AND IC'S	21
SCHEMATIC DIAGRAM	22～26
EXPLODED VIEW	27～29
REPLACEMENT PARTS LIST (Cabinet and Chassis Parts)	30
RESISTOR AND CAPACITOR PARTS LIST	31, 32

TECHNICAL SPECIFICATIONS (DIN 45 500)

Specifications are subject to change without notice for further improvement.

■ AMPLIFIER SECTION

20 Hz~20 kHz continuous power output
both channels driven 2 × 140W (4Ω)
2 × 105W (8Ω)

40 Hz~16 kHz continuous power output
both channels driven 2 × 140W (4Ω)
2 × 105W (8Ω)

1 kHz continuous power output
both channels driven 2 × 150W (4Ω)
2 × 115W (8Ω)

Total harmonic distortion
rated power at 20 Hz~20 kHz 0.008% (4Ω)
0.005% (8Ω)
rated power at 40 Hz~16 kHz 0.008% (4Ω)
0.005% (8Ω)
rated power at 1 kHz 0.008% (4Ω)
0.005% (8Ω)
half power at 20 Hz~20 kHz 0.004% (8Ω)
half power at 1 kHz 0.002% (8Ω)
−26 dB power at 1 kHz 0.05% (4Ω)
50 mW power at 1 kHz 0.1% (4Ω)

Intermodulation distortion
rated power at 250 Hz: 8 kHz=4:1, 4Ω 0.01%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω 0.007%

Power bandwidth
both channels driven, −3 dB
(THD 0.03%) 5 Hz~70 kHz (4Ω)
(THD 0.02%) 5 Hz~70 kHz (8Ω)

Residual hum and noise (straight DC) 0.4 mV
Damping factor 30 (4Ω), 60 (8Ω)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Input sensitivity and impedance
- **PHONO MM** 2.8 mV/47kΩ
- **MC** 180 μV/47Ω
- **TUNER, AUX** 180 mV/36kΩ
- **TAPE 1 REC/PLAY** 200 mV/39kΩ
- **TAPE 2** 180 mV/36kΩ

PHONO maximum input voltage (1 kHz, RMS)
- **MM** 150 mV
- **MC** 10 mV

S/N
- **rated power (4Ω)**
  - **PHONO MM** 78 dB (88 dB, IHF '66)
  - **MC** 72 dB (72 dB, IHF '66: 250 μV input)
  - **TUNER, AUX** 94 dB (106 dB, IHF '66)
- **−26 dB power (4Ω)**
  - **PHONO MM** 72 dB
  - **MC** 69 dB
  - **TUNER, AUX** 70 dB
- **50 mW power (4Ω)**
  - **PHONO MM** 67 dB
  - **MC** 66 dB
  - **TUNER, AUX** 67 dB

Frequency response
- **PHONO** RIAA standard curve ±0.3 dB (30 Hz~15 kHz)
- **TUNER, AUX, TAPE (straight DC)** DC~150 kHz (−3 dB) +0 dB, −0.2 dB (20 Hz~20 kHz)

Tone controls
- **SUPER BASS** 30 Hz, +10 dB~0 dB
- **BASS** 100 Hz, +7 dB~ −7 dB
- **TREBLE** 20 kHz, +10 dB~ −10 dB

Turnover frequency
- **SUPER BASS** 75 Hz, 150 Hz (−12 dB/oct.)
- **BASS** 500 Hz
- **TREBLE** 2 kHz

Subsonic filter 20 Hz, −12 dB/oct.
High-cut filter 7 kHz, −6 dB/oct.
Loudness control (volume at −30 dB) 50 Hz, +7 dB
Output voltage and impedance
- **REC OUT** 180 mV
- **REC/PLAY** 30 mV/82kΩ

Channel balance, AUX 250 Hz~6,300 Hz ±1.0 dB
Channel separation, AUX 1 kHz 55 dB
Headphones output level and impedance 700 mV/330Ω
Muting −20 dB
Load impedance
- **MAIN or REMOTE** 4Ω~16Ω
- **MAIN and REMOTE** 8Ω~16Ω

■ GENERAL

Power consumption 1000W
Power supply AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D) 430 × 153 × 395 mm (16-15/16" × 6-1/32" × 15-9/16")
Weight 15.5 kg (34.2 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

TECHNISCHE DATEN (DIN 45 500)

Spezifikationen können infolge von verbesserungen ohne Ankündigung geändert werden.

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 20 Hz ~ 20 kHz
- **beide Kanäle ausgesteuert** 2 × 140W (4 Ω) 2 × 105W (8 Ω)

Dauerton-Ausgangsleistung bei 40 Hz ~ 16 kHz
- **beide Kanäle ausgesteuert** 2 × 140W (4 Ω) 2 × 105W (8 Ω)

Dauerton-Ausgangsleistung bei 1 kHz
- **beide Kanäle ausgesteuert** 2 × 150W (4 Ω) 2 × 115W (8 Ω)

Gesamtklirrfaktor
- **Nennleistung bei 20 Hz ~ 20 kHz** 0,008% (4 Ω) 0,005% (8 Ω)
- **Nennleistung bei 40 Hz ~ 16 kHz** 0,008% (4 Ω) 0,005% (8 Ω)
- **Nennleistung bei 1 kHz** 0,008% (4 Ω) 0,005% (8 Ω)
- **halbe Nennleistung bei 20 Hz ~ 20 kHz** 0,004% (8 Ω)
- **halbe Nennleistung bei 1 kHz** 0,002% (8 Ω)
- **−26 dB Leistung bei 1 kHz** 0,05% (4 Ω)
- **50 mW Leistung bei 1 kHz** 0,1% (4 Ω)

Intermodulationsfaktor
- **Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω** 0,01%
- **Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω** 0,007%

Leistungsbandbreite
- **beide Kanäle ausgesteuert bei −3 dB**
  - **(THD 0.03%)** 5 Hz ~ 70 kHz (4 Ω)
  - **(THD 0.02%)** 5 Hz ~ 70 kHz (8 Ω)

Restbrumm und Geräusch (Gleichstrom-Geradeaus) 0,4 mV
Dämpfungsfaktor 30 (4 Ω), 60 (8 Ω)
Eingangsempfindlichkeit und -impedanz
- **Phono - magnetisch (PHONO MM)** 2,8 mV/47 kΩ
- **Phono - dynamisch (PHONO MC)** 180 μV/47 Ω
- **Tuner, Aux** 180 mV/36 kΩ
- **Tape 1 Aufnahme/Wiedergabe (TAPE 1 REC/PLAY)** 200 mV/39 kΩ
- **Tape 2 (TAPE 2)** 180 mV/36 kΩ

Maximale TA-Eingangsspannung (1 kHz, eff.)
- **magnetisch (MM)** 150 mV
- **dynamisch (MC)** 10 mV

Geräuschabstand
- **Nennleistung (4 Ω)**
  - **Phono - magnetisch (PHONO MM)** 78 dB (88 dB nach IHF '66)
  - **Phono - dynamisch (PHONO MC)** 72 dB (72 dB nach IHF '66: 250 μV input)
  - **Tuner, Aux** 94 dB (106 dB nach IHF '66)
- **−26 dB Leistung (4 Ω)**
  - **Phono - magnetisch (PHONO MM)** 72 dB
  - **Phono - dynamisch (PHONO MC)** 69 dB
  - **Tuner, Aux** 70 dB
- **50 mW Leistung (4 Ω)**
  - **Phono - magnetisch (PHONO MM)** 67 dB
  - **Phono - dynamisch (PHONO MC)** 66 dB
  - **Tuner, Aux** 67 dB

Frequenzgang
- **Phono** RIAA-Standardkurve ±0,3 dB (30 Hz ~ 15 kHz)
- **Tuner Aux, Tape (Gleichstrom-Geradeaus)** DC ~ 150 kHz (−3 dB) +0 dB, −0,2 dB (20 Hz ~ 20 kHz)

Klangregler
- **Tiefbaßreglers** 30 Hz, +10 dB ~ 0 dB
- **Baßregler (BASS)** 100 Hz, +7 dB ~ −7 dB
- **Höhenregler (TREBLE)** 20 kHz, +10 dB ~ −10 dB

Übergangsfrequenz
- **Tiefbaßreglers** 75 Hz, 150 Hz (−12 dB/Okt.)
- **Baßregler (BASS)** 500 Hz

Höhenregler (TREBLE)	2 kHz
Tiefenfilter	20 Hz, −12 dB/Okt.
Rauschfilter	7 kHz, −6 dB/Okt.
Gehörrichtige Lautstärkekorrektur (Loudness)	
(bei −30 dB Ausgangsleistung)	50 Hz, +7 dB
Ausgangsspannung und -impedanz	
Aufnahmeausgang (REC OUT)	180 mV
Aufnahme/Wiedergabe (REC/PLAY)	30 mV/82 kΩ
Kanalabweichung (Aux, 250 Hz ~ 6300 Hz)	±1,0 dB
Übersprechdämpfung (Aux, 1 kHz)	55 dB
Kopfhörerpegel und -impedanz	700 mV/330 Ω
Tondämpfung	−20 dB
Lautsprecherimpedanz	
MAIN oder REMOTE	4 Ω ~ 16 Ω
MAIN und REMOTE	8 Ω ~ 16 Ω

■ ALLGEMEINE DATEN

Leistungsaufnahme	1000 W
Netzspannung	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Abmessungen (B×H×T)	430 × 153 × 395 mm
Gewicht	15,5 kg

Bemerkung:
Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

DONNEES TECHNIQUES Sujet à changment sans préaris.
(DIN 45 500)

■ SECTION AMPLIFICATEUR

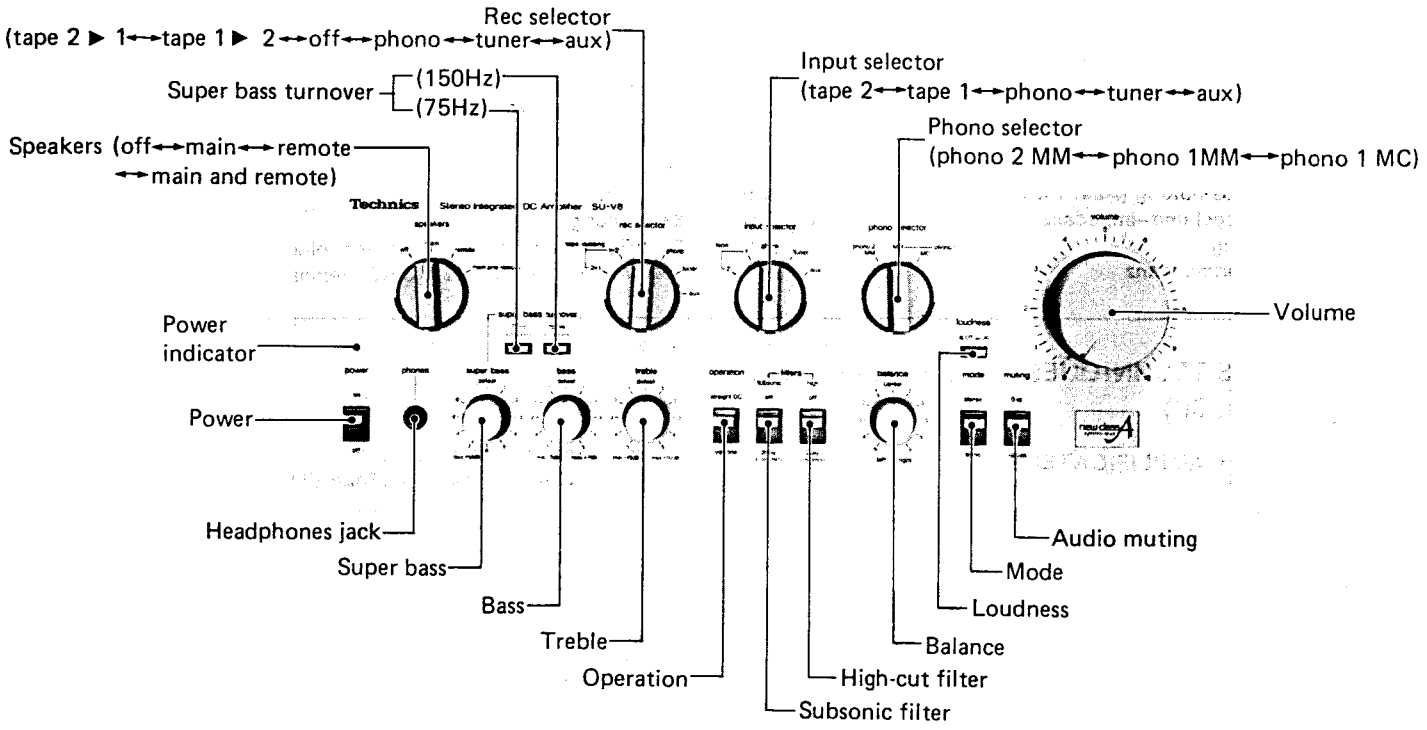
Puissance de sortie continue de 20 Hz~20 kHz,	
les deux canaux en circuit	2 × 140W (4Ω)
	2 × 105W (8Ω)
Puissance de sortie continue de 40 Hz~16 kHz,	
les deux canaux en circuit	2 × 140W (4Ω)
	2 × 105W (8Ω)
Puissance de sortie continue à 1 kHz	
les deux canaux en circuit	2 × 150W (4Ω)
	2 × 115W (8Ω)
Distorsion harmonique totale	
à puissance nominale (20 Hz~20 kHz)	0,008% (4Ω)
	0,005% (8Ω)
à puissance nominale (40 Hz~16 kHz)	0,008% (4Ω)
	0,005% (8Ω)
à puissance nominale (1 kHz)	0,008% (4Ω)
	0,005% (8Ω)
à demi-puissance (20 Hz~20 kHz)	0,004% (8Ω)
à demi-puissance (1 kHz)	0,002% (8Ω)
puissance de −26 dB à 1 kHz	0,05% (4Ω)
puissance de 50 mW à 1 kHz	0,1% (4Ω)
Distorsion d'intermodulation	
à puissance nominale à 250 Hz: 8 kHz=4:1, 4Ω	0,01%
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,007%
Réponse de fréquences	
les deux canaux en circuit, −3 dB	
(THD 0.03%)	5 Hz~70 kHz (4Ω)
(THD 0.02%)	5 Hz~70 kHz (8Ω)
Bruit et ronflement résiduels (c.c. direct)	0,4 mV
Coefficient d'amortissement	30 (4Ω), 60 (8Ω)
Sensibilité et impédance d'entrée	
PHONO, AIMANT MOBILE (PHONO MM)	2,8 mV/47kΩ
PHONO, BOBINE MOBILE (PHONO MC)	180 μV/47Ω
SYNTONISATEUR, AUX (TUNER, AUX)	180 mV/36kΩ
BANDE 1, ENREGISTREMENT/LECTURE (TAPE 1 REC/PLAY)	200 mV/39kΩ
BANDE 2 (TAPE 2)	180 mV/36kΩ
PHONO (tension d'entrée maximum, 1 kHz RMS)	
AIMANT MOBILE (MM)	150 mV
BOBINE MOBILE (MC)	10 mV
Signal/Bruit	
à puissance nominale (4Ω)	
PHONO, AIMANT MOBILE (PHONO MM)	78 dB (88 dB, IHF '66)
PHONO, BOBINE MOBILE (PHONO MC)	72 dB (72 dB, IHF '66: 250 μV input)
SYNTONISATEUR, AUX (TUNER, AUX)	94 dB (106 dB, IHF '66)
puissance de −26 dB (4Ω)	
PHONO, AIMANT MOBILE (PHONO MM)	72 dB
PHONO, BOBINE MOBILE (PHONO MC)	69 dB
SYNTONISATEUR, AUX (TUNER, AUX)	70 dB
puissance de 50 mW (4Ω)	
PHONO, AIMANT MOBILE (PHONO MM)	67 dB
PHONO, BOBINE MOBILE (PHONO MC)	66 dB
SYNTONISATEUR, AUX (TUNER, AUX)	67 dB
Réponse de fréquence	
PHONO	Courbe nominale RIAA ±0,3 dB (30 Hz~15 kHz)
SYNTONISATEUR, AUX, BANDE (TUNER, AUX, TAPE) (c.c. direct)	DC~150 kHz (−3 dB) +0 dB, −0,2 dB (20 Hz~20 kHz)
Réglage de la tonalité	
SUPERGRAVES	30 Hz, +10 dB~0 dB
BASSES (BASS)	100 Hz, +7 dB~ −7 dB
AIGUS (TREBLE)	20 kHz, +10 dB~ −10 dB
Fréquence charnière	
SUPERGRAVES	75 Hz, 150 Hz (−12 dB/oct.)
BASSES (BASS)	500 Hz
AIGUS (TREBLE)	2 kHz
Filtre subsonique	20 Hz, −12 dB/oct.
Filtre coupe-hauts	7 kHz, −6 dB/oct.
Compensateur physiologique (volume à −30 dB)	50 Hz, +7 dB
Tension de sortie et impédance	
SORTIE ENREGISTREMENT (REC OUT)	180 mV
ENREGISTREMENT/LECTURE (REC/PLAY)	30 mV/82 kΩ
Equilibrage des canaux, AUX 250 Hz~6 300 Hz	±1,0 dB
Séparation des canaux, AUX 1 kHz	55 dB
Niveau de sortie des casques et impédance	700 mV/330Ω
Réglage silencieux	−20 dB
Impédance de charge	
PRINCIPALE ou AUXILIAIRE (MAIN or REMOTE)	4Ω~16Ω
PRINCIPALE et AUXILIAIRE (MAIN and REMOTE)	8Ω~16Ω

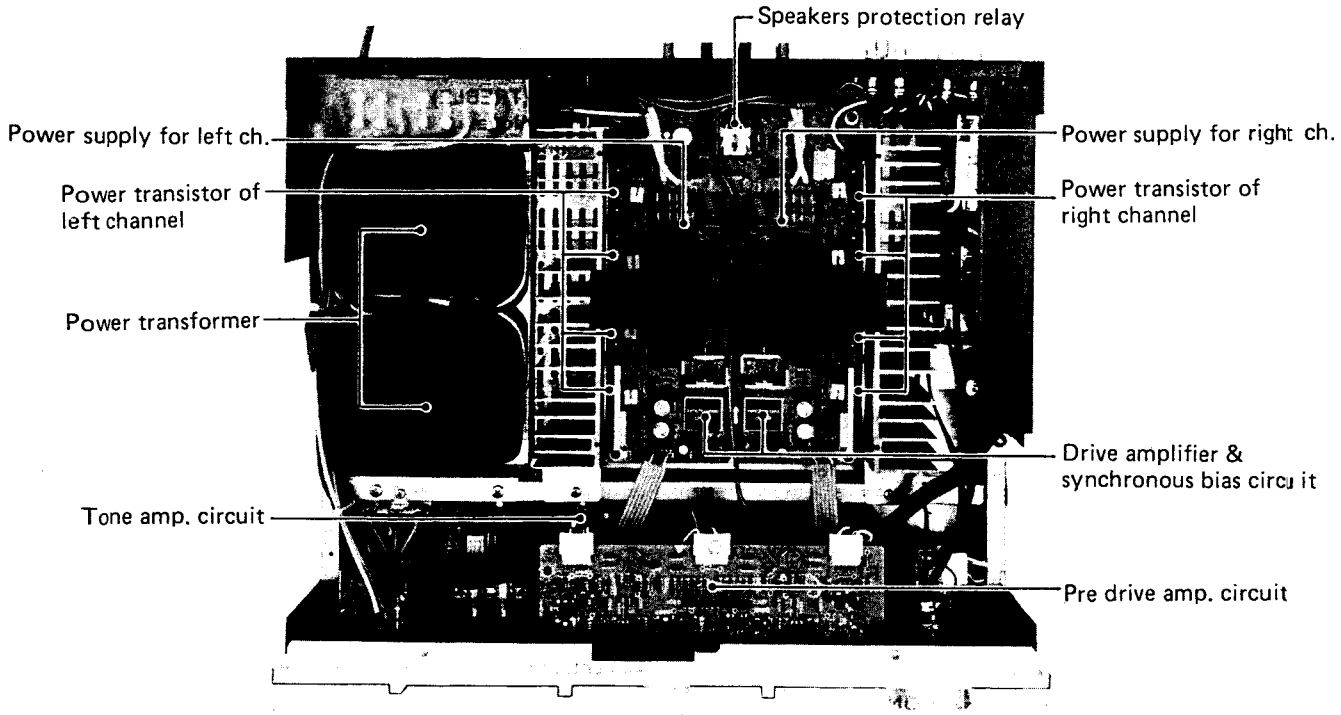
■ DIVERS

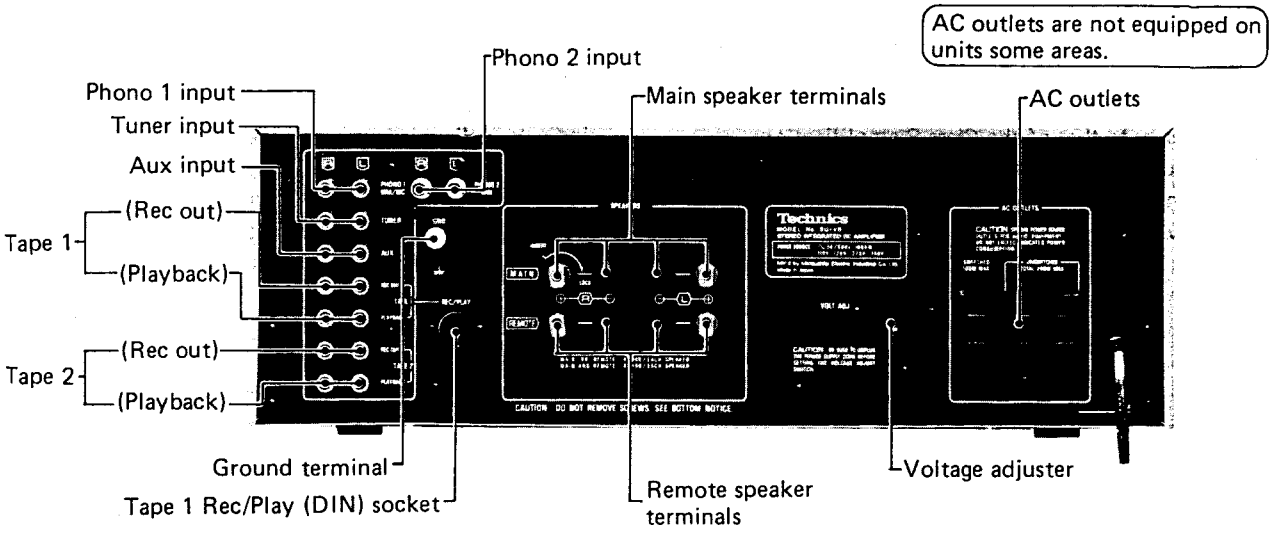
Consommation	1000W
Alimentation	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L×H×Pr)	430 × 153 × 395 mm
Poids	15,5 kg

Remarque:
On mesure la distorsion harmonique totale au moyen d'un analyseur de spectre digital (Système H.P. 3045).

■ LOCATION OF CONTROLS




Speakers protection relay
Power supply for left ch.
Power supply for right ch.
Power transistor of left channel
Power transistor of right channel
Power transformer
Drive amplifier & synchronous bias circuit
Tone amp. circuit
Pre drive amp. circuit



■ OUTLINE OF THIS UNIT

In the world of amplifiers, the sound-quality and the output have been the two contradictory concepts. To obtain inproved sound-quality within a limited budget the tendency is to lower the power output, on the other hand, larger output means a sacrifice in sound quality. Therefore, if better sound quality is required, it is beneficial to adopt Class A amplification method, and if large output power is desired, it si wise to select Class B amplification method. This unit has employed the New Class A method to obtain a high output of 70W per channel with a distortion rate of 0.007% (For an 8 ohms load at rated output of 20Hz ~ 20kHz). This low cost stereo integrated amplifier, considering its high output, was developed as a successful combination of fine sound quality and high power output.

• Class B amplification and Class A amplification

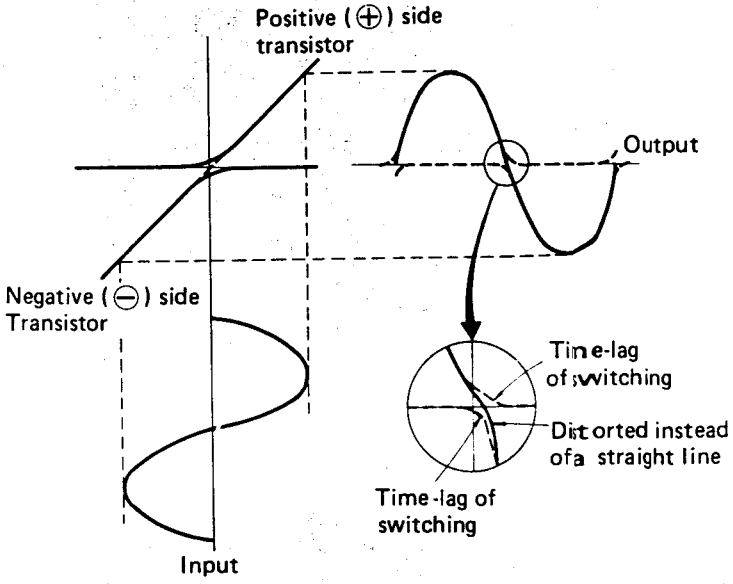
1. Class B amplification

Although Class B amplification has high power efficiency, it invariably introduces switching distortion due to its operating principle. As shwon in Fig. 1, a transistor on the positive (⊕) side amplifies the positive half of the signal, while a transistor on the negative (⊖) side amplifies the negative half of the signal.

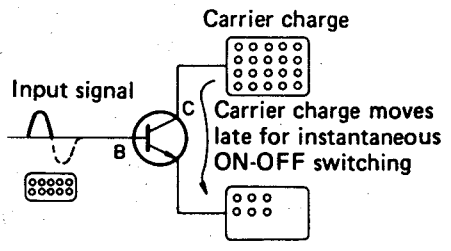
Since only one transistor on either ⊕ or ⊖ side works at any given time, less heat is generated and the power efficiency is higher. However, the switching process is not a smooth one between ⊕ and ⊖ or between ⊖ and ⊕, resulting in distortion. The faster the speed of a signal (higher frequency) is, (as shown in Fig. 2) the more difficult it is for the transistor to catch up instantaneously and the later the carrier charge on the output sides moves (distorted). In recent years, new transistors were developed which can respond to high speeds at high frequencies and which help to improve the distortion greatly though it is difficult to eliminate the distortion completely .

2. Class A amplification

As the transistors on positive (⊕) and negative (⊖) sides amplify signals continuously, switching is not necessary. Accordingly, no switching distortion exists. However, power efficiency becomes very low because this method requires a large current even when there is no signal to be amplified and more heat is generated.



(Operation of Class B amplifier)
Fig. 1



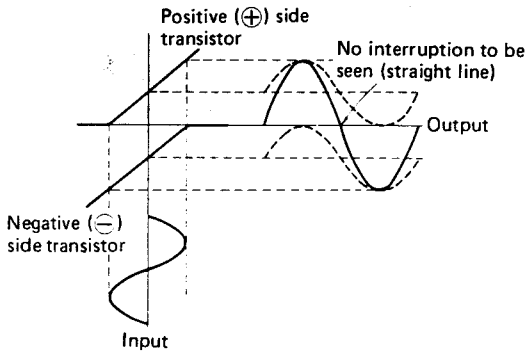
(Transition of electric charge inside the transistor)
Fig.2

- **New Class A amplification method**

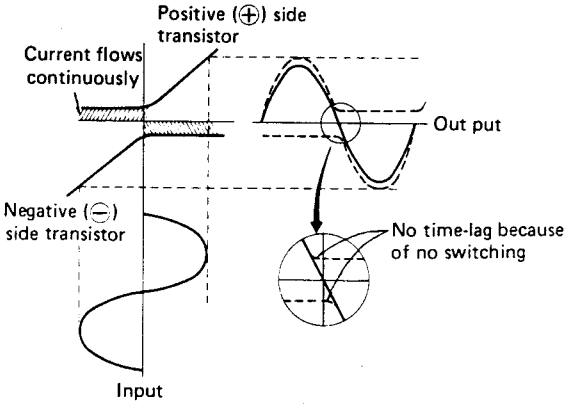
  This method combines and utilizes the advantages of Class A, B, or Class AB amplification methods to eliminate distortion and to assure almost equal power efficiency to that of the Class B amplification.

  The function of the synchronous bias circuit allows a certain constant flow of current in transistors on the positive (⊕) and negative (⊖) sides, the output transistors are never turned OFF while reproducing any signals, and the distortion caused by switching is therefore eliminated.

  Photos 1 ~ 4 show performance comparisons between Class B and the New class A amplifier. Photos 1 and 2 indicate collector current wave forms at their output stages on the positive (⊕) side and negative (⊖) side. (Output transistors are not turned OFF in the case of New Class A.) Output signal wave forms and distortion wave forms are shown in Photos 3 and 4.

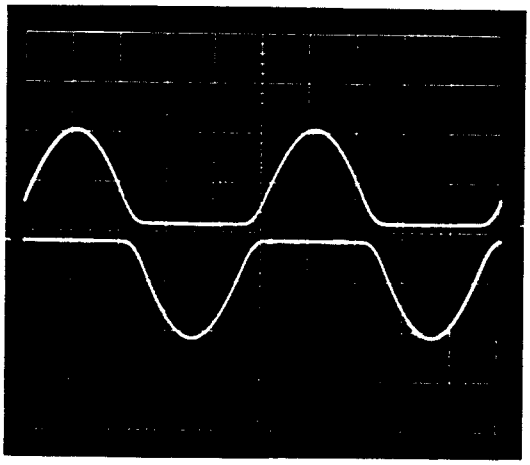


(Operation of Class A amplifier)
Fig. 3

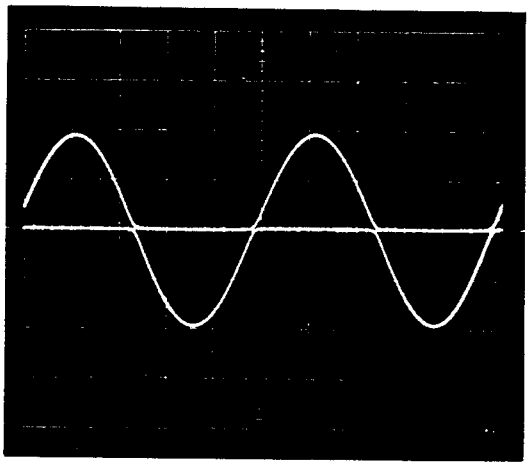


(Operation of New Class A amplifier)
Fig. 4

- **Collector current wave forms**

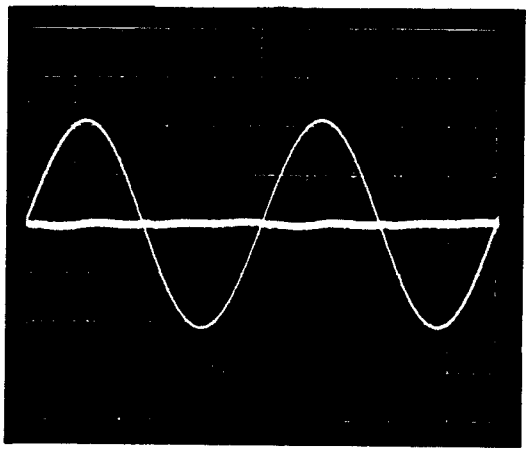


(New Class A amplifier)
Photo 1

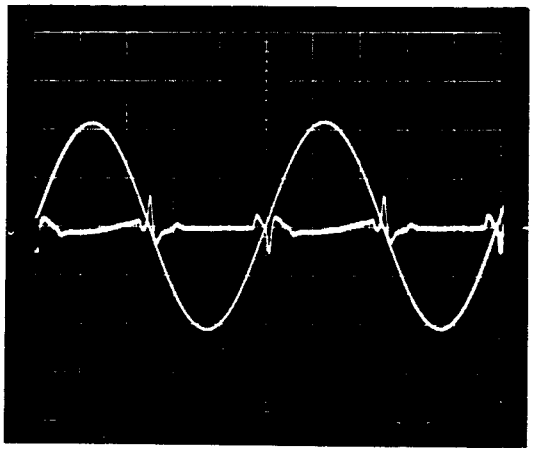


(Class B amplifier)
Photo 2

- **Output signal and distortion wave forms**



(New Class A amplifier)
Photo 3



(Class B amplifier)
Photo 4

■ TECHNICAL INSTRUCTIONS

The following diagram indicates the synchronous bias circuit of this unit. (The diagram shown is only for the righ channel, but it is identical for the left channel). The first stage consists of a differential circuit (Q309), a current mirror load (Q304) and an emitter follower (Q312). The driver circuit consists of the voltage amplifier stage (Q314) having current stabilizer load (Q316) and the SEPP voltage amplifier stage (Q614, Q616). Its emitter follower output works as a Class A amplifier by bias 1. This in turn is connected to the SEPP final stage of the Darlington output circuit through the synchronous bias circuit by bias 2 and 3. We can consider this a three-stage-Darlington output circuit, where a synchronous bias circuit is inserted between the first SEPP Class A amplifier and the second SEPP stage.
Bias 2 and 3 are the circuits that prevent the output stage on the positive (⊕) side (for bias 2) and on the negative (⊖) side (for bias 3) from turning OFF during the reproduction of any signals. Both operate on fixed current with the voltage set at the value of V_F 2.

- **When no signal exists:**
  The idling current (I_{CQ}) of output transistors (Q622, Q624) is the sum of the current I_{CQ} 1 determined by bias 1 and the current I_{CQ} 2 determined by bias 2 and bias 3.

That is, $I_{CQ} = I_{CQ}\,1 + I_{CQ}\,2$

where,

$$I_{CQ}\,1 = \frac{V_F\,1 - (V_{BE}\,1 + V_{BE}\,2 + V_{BE}\,3 + V_{BE}\,4 + V_{BE}\,5 + V_{BE}\,6 + V_D\,1 + V_D\,2)}{2R_E}$$

$$I_{CQ}\,2 = \frac{2V_F\,2 - (V_{BE}\,3 + V_{BE}\,4 + V_{BE}\,5 + V_{BE}\,6 + V_D\,3 + V_D\,4)}{2R_E}$$

- **When signals are applied:**
  When signals swing to the positive (⊕) side, the current Io flows into the output stage (Q622) on the positive (⊕) side, generating a voltage R_E Io at the emitter resistor R_E. This reduces the collector current on the negative (⊖) side of the output stage due to bias 1. Since bias 3 acts as a fixed voltage source, bias is applied to the negative (⊖) side transistors Q620 and Q624, and I_{CQ}2 keeps flowing. That is, the negative (⊖) side output stage continues to operate without being cut-off. When the signals swing to the negative (⊖) side, the positive (⊕) side output stage remains operating in exactly the same way due to bias 2. That is, the signals are reproduced without switching.
  In the synchronous bias circuit, high speed diodes which can follow precisely and correctly the high frequency signals are used for D610 and D612 where the signals pass through and for D614 and D616 where the current flows to pass the signals without switching at the time of signal reproduction.

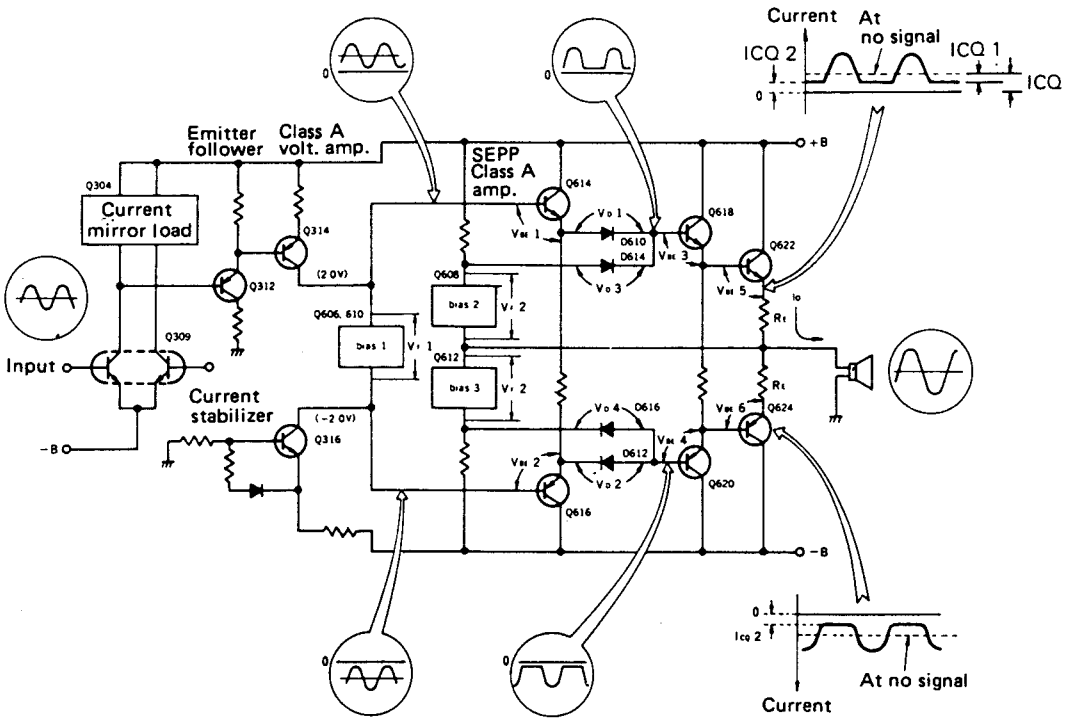


Fig. 5

- **Operational check of synchronous bias circuit**

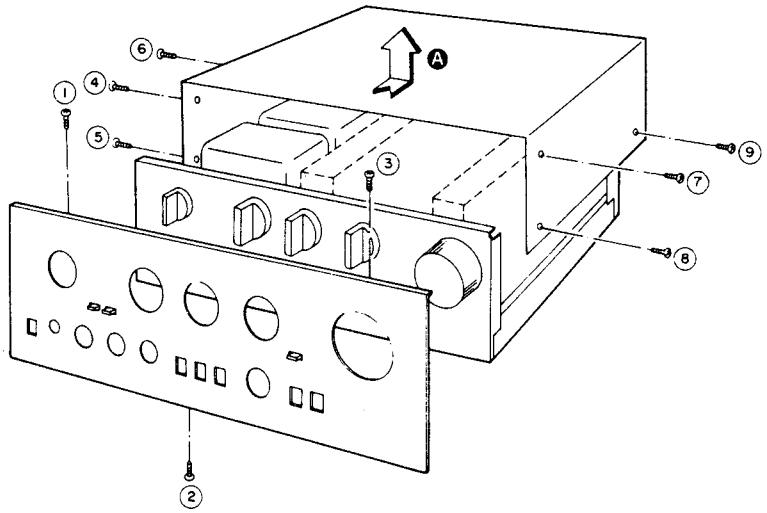
To check the operation of the synchronous bias circuit:

1. Measure the emitter current with an oscilloscope connected to the emitter of output transistor.
2. Turn the bias 2 and bias 3 (VR603 in left channel; semi-fixed volume for clamp voltage adjustment of VR604 in right channel), then the operation is normal if Icq 2 operates.
3. If the circuits of bias 2 and 3 are not in operation, the operation will be the same as in a conventional Class B amplifier where switching distortion is generated.

■ DISASSEMBLY INSTRUCTIONS

• How to remove the cabinet

1. Remove the 6 setscrews (Fig. 6 ④~ ⑨) on the side of the cabinet.
2. Shift the cabinet backward and lift it upward (Arrow Ⓐ in Fig. 6)

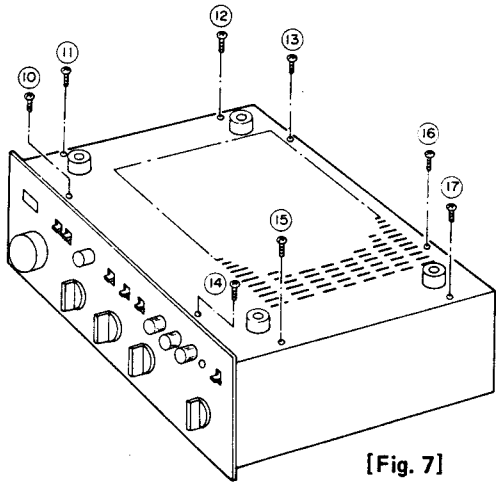


[Fig. 6]

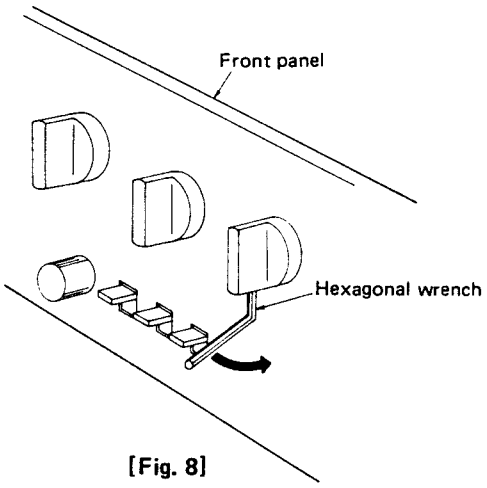
• How to remove the bottom board and the front panel

1. Remove the 8 setscrews (Fig. 7 ⑩ ~ ⑰) holding the bottom board.
2. Remove the 3 setscrews (Fig. 6 ① ~ ③) holding the front panel.
3. Puss the front panel outward from the front of the unit.

Note: To remove the 4 knobs (phono selector, input selector, Rec selector, and speaker switch knobs) use a 3-mm hexagonal wrench since the knobs are secured with 3-mm bolts. (Refer to Fig. 8.)



[Fig. 7]

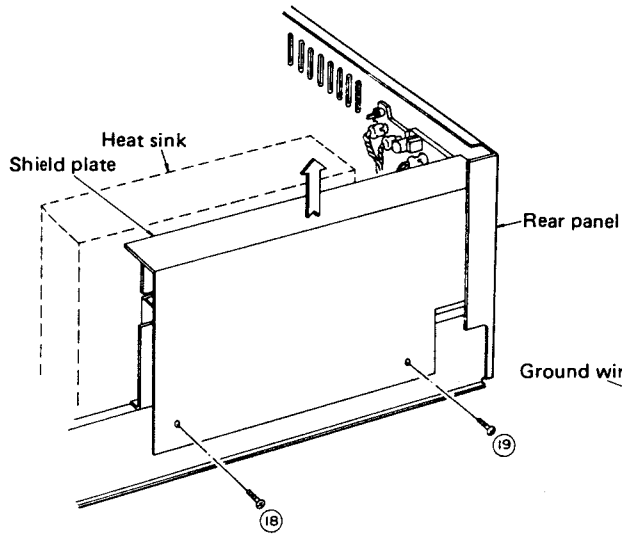


[Fig. 8]

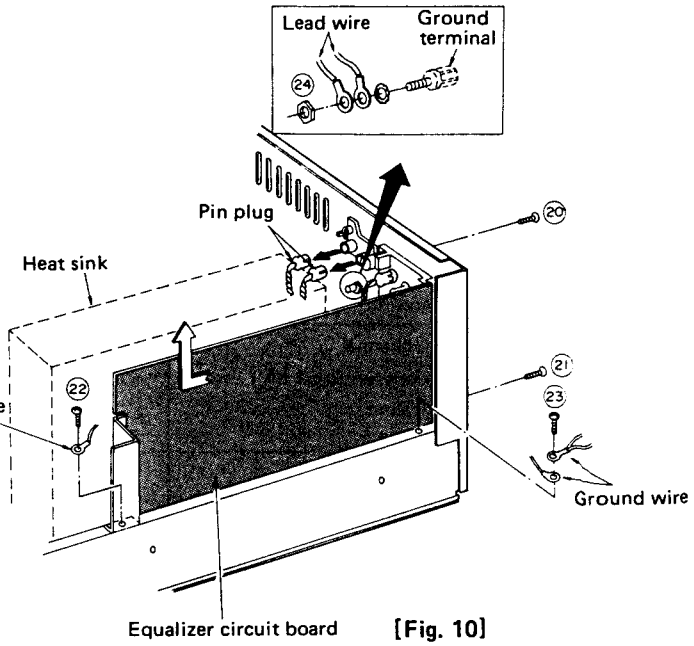
• How to remove the equalizer circuit board

1. Remove the cabinet. (Refer to "How to remove the cabinet".)
2. Remove the 2 setscrews (Fig. 9 : ⑱, ⑲) to detach the shield plate.
3. Remove the 2 setscrews (Fig. 10 : ⑳, ㉑) of the input terminal plate, 1 setscrew (Fig. 10 : ㉒) of the equalizer circuit board fitting, and 1 setscrew (Fig. 10 : ㉓) of the ground wire.
4. Pull out the 2 pin plugs connected to the phono input terminal. Remove the nut (Fig. 10 : ㉔) of the ground terminal to disconnect the lead wire.
5. Pull the equalizer circuit board to remove it with care for the wires and parts.

Note: Be sure to connect the remove ground wire to the chassis before repair.



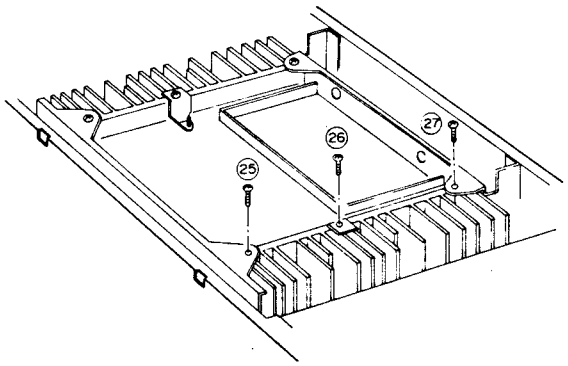
[Fig. 9]



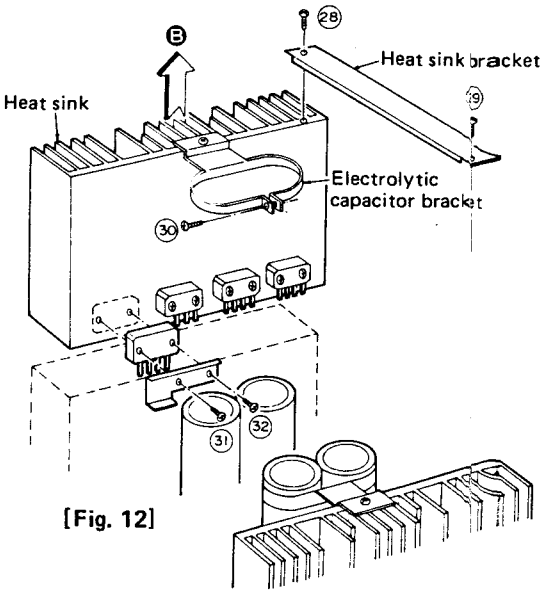
[Fig. 10]

• How to remove the power IC

1. Remove the cabinet and bottom board. (Refer to the sections "How to remove the cabinet " and "How to remove the bottom board and the front panel".)
2. Remove the solder of 4 power transistors. (Q621, 623, 625, 627).
3. Remove the 3 setscrews(Fig. 11: ㉕ ~ ㉗) at the bottom of the heat sink.
4. Remove the 2 setscrews(Fig. 12: ㉘, ㉙) holding the heat sink bracket and then remove the 1 setscrew(Fig. 12: ㉚) on the electrolytic capacitor bracket.
5. Remove the heat sink along with electrolytic capacitor bracket in the direction of the arrow Ⓑ. (Refer to Fig. 12)
6. Remove the 2 setscrews(Fig. 12: ㉛, ㉜) used to secure the power IC on the heat sink, and then pull the power IC.
7. When mounting the power IC, apply silicone compound (or equivalent heat diffuser) to the back of power IC, and then forrow the steps 1 ~ 6 reversely.



[Fig. 11]



[Fig. 12]

• Before starting the repairing

Before adjusting or repairing, be sure to short-circuit opposite poles of the 10000μF capacitors (C405 ~ 408) with a resistor approximately of 10Ω, 5W" for discharging the charged voltage.
Short-circuiting with a screw driver and the like is not only dangerous, but may destroy transistors and diodes, and should therefore be avoided.

■ ADJUSTING INSTRUCTIONS ENGLISH

• Setting of controls and instruments to be used

1. Operation switch . . . .straight DC
2. Speaker switch . . . . . .main
3. Sound volume. . . . . .0 (minimum)
4. DC voltmeter (capable to measure 5mV)

No.	Adjustments	DC voltmeter Connections	Adjusting Point	Adjustment Procedure
1	Voltage regulator	Between TP402 and ground	VR401	* Turn voltage regulator semi-fixed resistor VR301 to minimum. (counter-clockwise direction) * Adjust VR401 to 17.5V
2	DC Balance	L channel Between R651 (Ⓐ) and ground	VR301	* Adjust VR301 to obtain a minimum reading, using the 30mV range on the DC voltmeter (within ± 10mV) * Cut off the jumper wire (J301) if adjustment is not posible.
3		R channel Between R652 (Ⓐ) and ground	VR302	* Adjust VR302 to obtain a minimum reading, using the 30mV range on the DC voltmeter * Cut off the jumper wire (J302) if adjustment is not possible.
4	Clamp Voltage	L channel Between TP601 and TP603 (minus probe) R channel Between TP602 and TP604 (minus probe)	VR603 (L channel) VR604 (R channel)	* Turn Icq semi-fixed resistors VR601, 602 to minimum. (counter-clockwise direction) * Adjust VR603 (L ch) and VR604 (R ch) to approx. 1mV after ten minutes warm-up time.
5	Icq (Adjustment using a DC voltmeter)	L channel Between TP601 and TP603 (minus probe) R channel between TP602 and TP604 (minus probe)	VR601 (L channel) VR602 (R channel)	* Adjust VR601 (L ch) and VR602 (R ch) to approx. 40mV after ten minutes warm-up time.

• Icq can be adjusted with oscilloscope and the distortion analyser.

Instruments to be used

1. Oscillator (20kHz sine wave)
2. Distortion analyser
3. Oscilloscope

1st Feed 20kHz sine wave into the TUNER or AUX terminals.

2nd Volume control to maximum of this unit.

3rd Connect the distortion analyser to the speaker terminals and connect the output from the distortion analyser to the vertical input of the oscilloscope.

4th Turn the oscillator attenuater so that the output at the speaker terminal reaches 20V.

5th Adjust the Icq semi-fixed resistors VR601 (left channel), VR602 (right channel) for minimum distortion on the oscilloscope.

■ EINSTELLUNGSANWEISUNGEN DEUTSCH

• Einstellung der zu benutzenden Regler und Instrumente

1. Betriebsschalter. . . . . .Gleichstrom (direkt)
2. Lautsprecherschalter . . .Hauptlautsprecher ("main")
3. Lautstärke . . . . . ."0" (Minimalstellung)
4. Gleichstromvoltmeter. . 5mV Meßbereich erforderlich.

Nr	Einstellungen	Gleichstromvoltmeterverbindungen	Einstellungspunkte	Einstellungsvorgang
1	Spannungs-sregler	Zwischen TP402 und Masse.	VR401	* Die spannungsregler halbfesteingestellten Widerstände **VR301** auf Minimalstellung drehen. (Entgegen dem Uhrzeigersinn) * **VR401** auf 17.5V abstimmen.
2	Gleichstrom-balance	L-Kanal. Zwischen R651 (Ⓐ) und Masse.	VR301	* Durch Benutzung des 30mV-Bereiches (innerhalb von ±10mV) des Gleichstrom-voltmeters, den regelbaren Widerstand **VR301** auf minimalen Wert einstellen. * Wenn eine Einstellung nicht möglich ist, die Schaltader (J301) abtrennen.
3		R-Kanal. Zwischen R652 (Ⓐ) und Masse.	VR302	* Durch Benutzung des 30mV-Bereiches (innerhalb von ±10mV) des Gleichstrom-voltmeters, den regelbaren Widerstand **VR302** auf minimalen Wert einstellen. * Wenn eine Einstellung nicht möglich ist, die Schaltader (J302) abtrennen.

4	Klemmspann-ung	L-Kanal. Zwischen TP601 und TP603 (Minustest) R-Kanal. Zwischen TP602 und TP604 (Minustest)	VR603 (L-Kanal) VR604 (R-Kanal)	* Die Icq halbfesteingestellten Widerstände **VR601** und **VR602** auf Minimalstellung drehen. (Entgegen dem Uhrzeigersinn) * **VR603** (L-Kanal) und VR604 (R-Kanal) auf ungefähr 1mV, nach 10 Minuten Anwärmezeit, einstellen.
5	Icq (Einstellungen mit einem Gleichstrom-voltmeter	L-Kanal. Zwischen TP601 und TP603 (Minustest) R-Kanal. Zwischen TP602 und TP604 (Minustest)	VR601 (L-Kanal) VR602 (R-Kanal)	* **VR601** (L-Kanal) und **VR602** (R-Kanal) auf ungefähr 40mV, nach 10 Minuten Anwärmezeit, einstellen.

• Icq Kann mit einem Oszilloskop und dem Verzerrungsanalyser eingestellt werden.

Zu benutzende Instrumente
1. Schwingungserreger (20kHz sinus)
2. Verzerrungsanalyser
3. Oszilloskop

Erster Schritt: Die 20kHz Sinuswelle in die TUNER-oder AUX-Buchsen eingeben.

Zweiter Schritt: Den Lautstärkeregler dieses Gerätes auf Maximalstellung bringen.

Dritter Schritt: Den Verzerrungsanalyser mit den Lautsprecherklemmen verbinden, und den Ausgang des Verzerrungsanalysers mit. dem Vertikaleingang des Oszilloskops verbinden.

Vierter Schritt: Den Eichungsregler des Oszilloskops auf eine Weise regeln, daß der Ausgang der Lautsprecherklemmen auf 20 Volt kommt.

Fünfter Schritt: Den Icq halbeinstellbaren Widerstand **VR601** (L-Kanal) und **VR602** (R-Kanal), auf minimale Verzerrungsanzeige dem Oszilloskop einstellen.

■ INSTRUCTIONS DE REGLAGE——FRANÇAIS

• Réglage des commandes et instruments à utiliser

1. Commutateur de marche/arrêt . . . . . .CC direct
2. Commutateur du haut-parleur . . . . . .Principal
3. Volume du son . . . . . .0 (minimum)
4. Voltmètre CC (pouvant mesurer 5mV)

No	Réglages	Connexions du voltmetre CC	Point de réglage	Procédé de réglage
1	Régulateur de potential	Entre TP402 et la masse	VR401	* Tourner les résistances **VR301** semifixes regulateur de potentiol sur le minimum. (à gauche) * Régler les **VR401** sur 17.5V.
2	Equilibre CC	Canal gauche Entre R651 (Ⓐ) et la masse	VR301	* Régler **VR301** pour obtenir une lecture minimale, à l'aide de la gamme de 30mV sur le voltmètre CC (avec ±10mV). * Couper le fil volant (J301) si le réglage est impossible.
3		Canal droite Entre R652 (Ⓐ) et la masse	VR302	* Régler **VR302** pour obtenir une lecture minimale, à l'aide de la gamme de 30mV sur le voltmètre CC (avec ±10mV) * Couper le fil volant (J302) si le réglage est impossible.
4	Tension de blocage	Canal G. Entre TP601 et TP603 (sonde au moins) Canal D. Entre TP602 et TP604 (sonde au moins)	VR603 (Canal G) VR604 (Canal D)	* Tourner les résistances **VR601**, **VR602** semifixes Icq sur le minimum. (à gauche) * Régler **VR603** (canal gauche) et **VR604** (canal droit) sur env. 1mV après 10 minutes de temps de chauffage.
5	Icq (réglage à l'aide d'un voltmètre CC)	Canal G. Entre TP601 et TP603 (sonde au moins) Canal D. Entre TP602 et TP604 (sonde au moins).	VR601 (Canal G) VR602 (Canal D)	* Régler les **VR601** (canal gauche) et **VR602** (canal droit) sur env. 40mV après 10mn. de prèchauffage.

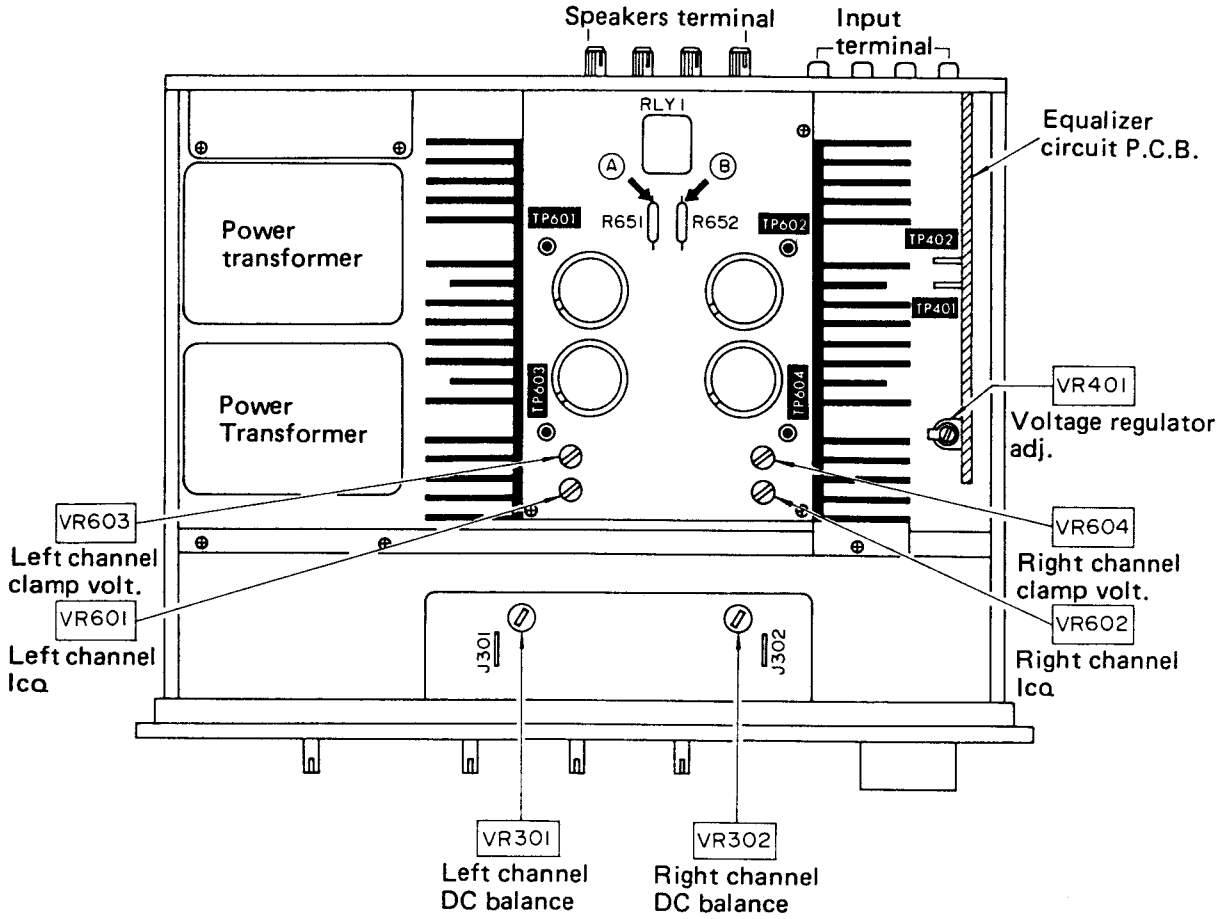
- **Icq peut être réglé à l'aide d'un oscilloscope et un analyseur de distorsion.**

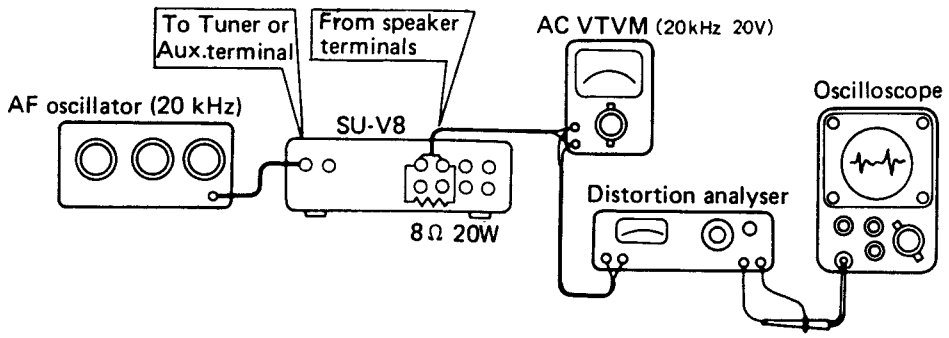
Instruments à utiliser

1. Oscillateur (onde sinusoîdale de 20kHz)
2. Analyseur de distorsion
3. Oscilloscope

1. Alimenter une onde sinusoîdale de 20kHz aux bornes TUNER et AUX.
2. Placer la commande de volume, sur le maximum de cet appareil.
3. Brancher l'analyseur de distorsion aux bornes du haut-parleur et brancher la sortie de l'analyseur de distorsion à l'entrée verticale de l'oscilloscope.
4. Tourner l'atténuateur de l'oscillateur de telle sorte que la sortie à la borne du haut-parleur, atteigne 20V.
5. Régler les résistances **VR601** (canal gauche) et **VR602** (canal droit) semi-fixes Icq sur la distorsion minimale de l'oscilloscope.

■ ADJUSTING POINTS



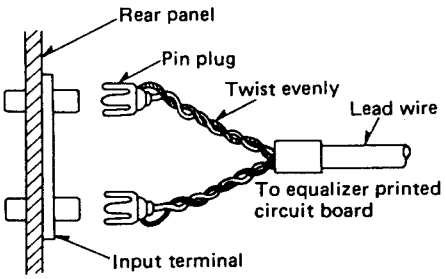


(I CQ adjustment with the oscilloscope and the distortion analyser)
(Icq-Einstellung mit Oszilloskop und Verzerrungsanalyser)
(Réglage de Icq à l'aide de l'oscilloscope et de l'analyseur de distorsion.)

[Fig. 13]

■ PRECAUTIONS FOR REPAIR

The S/N ratio of the equalizer circuit may be influenced depending on the way of lead wire arrangement. So after repair of this circuit, twist the leads of phono 1 and 2 evenly 5 or 6 times before connecting them to the terminals. Such may decrease the hum level. (See Fig. 14)



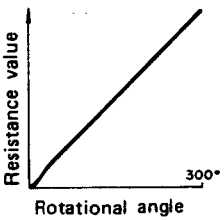
[Fig. 14]

■ VARIABLE RESISTORS

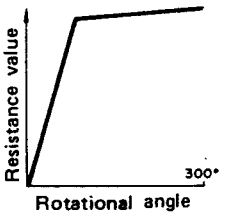
• Alteration of resistance values according to the rotational angles of variable resistors

Alteration characteristics as shown below are often used for sets. All are intended to keep the frequency response of the set at optimum levels, and are used according to the types of circuits. For example, characteristic (B) is used for sound volume adjustment; (A) and (C) are for bass and treble sound quality adjustment; (G) is for medium sound quality adjustment; and (BH) is for the adjustment of sound balance between the right and left.

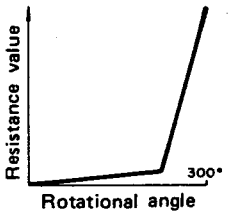
In the case of this unit, variable resistor with characteristic (C) which is short-circuited between its ends at rotational angle of 150° (center) is used for bass adjustment. Also, variable resistor with characteristic (C) whose resistance is zero at rotational angle of 150° (center) is used for treble adjustment. And characteristic (BH) in which two variable resistors are interlocked with characteristics (C) and (A) combined is used for the adjustment of sound level balance.



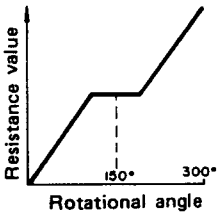
Characteristic (B)



Characteristic (C)

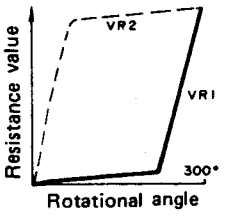


Characteristic (A)

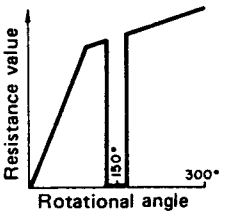


Characteristic (G)

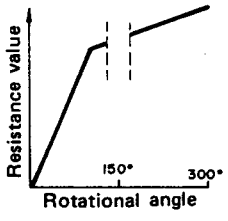
VR1 is inter locked with VR2



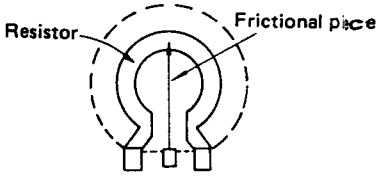
Characteristic (BH)



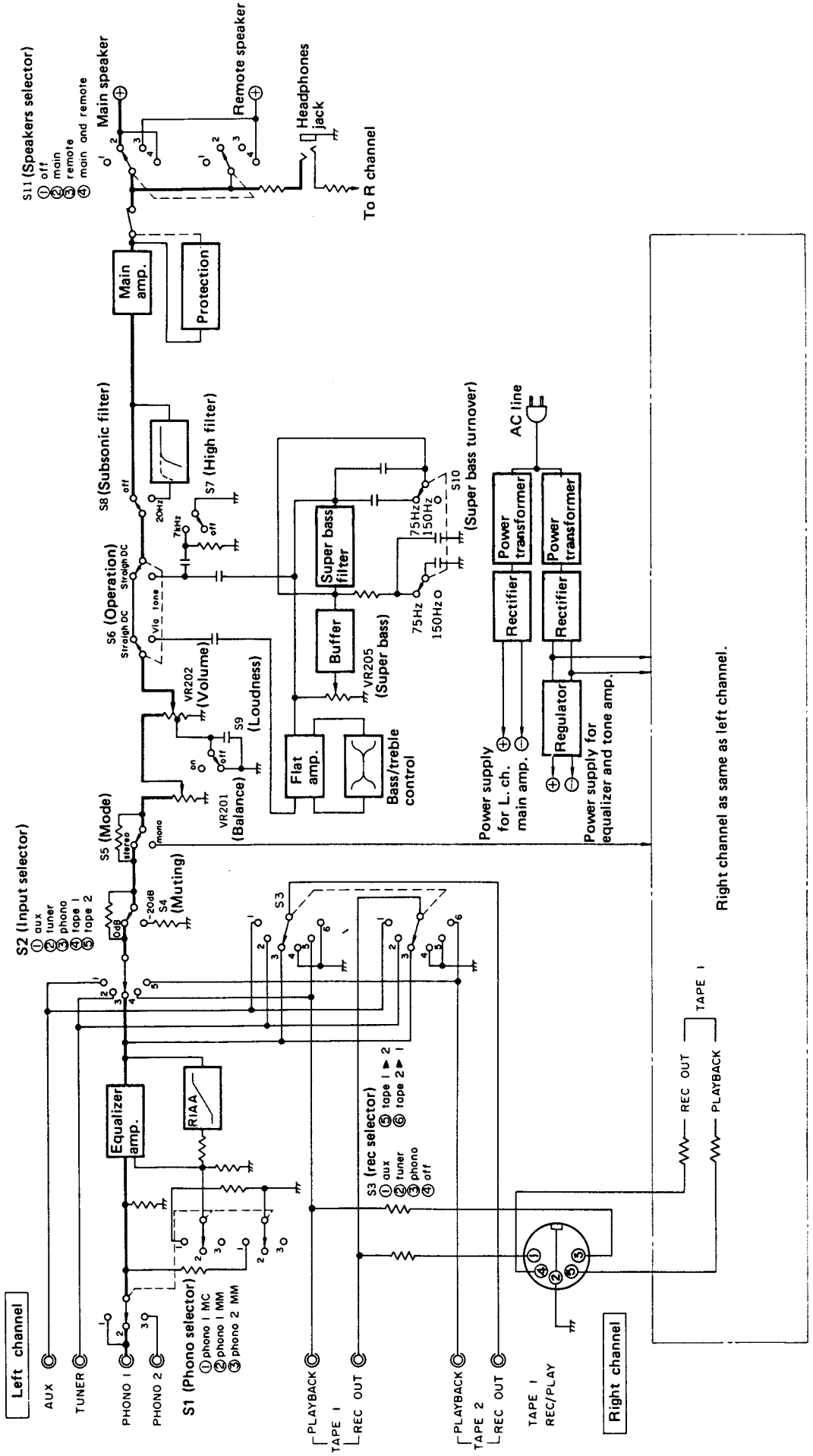
Characteristic (C): short-circuited at center



Characteristic (C): opened at center



■ BLOCK DIAGRAM



■ REPLACEMENT PARTS LIST (Electric Parts)

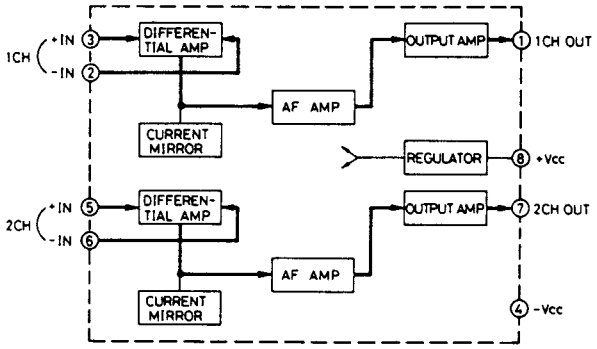
Notes: 1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2. ⚠ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.		Part No.	Part Name & Description
INTEGRATED CIRCUITS			
IC101, 201		SVINJM4559DS	IC, Equalizer and Tone Amplifer
IC202, 203		AN6552	IC, Super Bass Buffer and Super Bass Filter
IC551		SVITA7317P	IC, Protection
TRANSISTORS			
Q101 ~ 108		2SK170–GR	Transistor, Differential Amplifier
Q301, 302		SVIUPA68H–LK	Transistor, Buffer
Q303, 304		2SA995N–F	Transistor, Current Mirror
Q305 ~ 308, 455		2SC1815–Y	Transistor, Cascade and An Error Voltage Detector
Q309, 310		SVIUPA74V–PF	Transistor, Pre Drive
Q311, 312		2SA921–S	Transistor, Emitter Follower
Q313, 314		2SA1124–R	Transistor, Pre Diode
Q315, 316		2SC2632–R	Transistor, Constant Current
Q451, 452		2SK34–D1	Transistor, Diode For Current Stabilizer
Q453		2SC1913–Q	Transistor, Regulator
Q454		2SA913–Q	Transistor, Regulator
Q456, 603, 604		2SA1015–Y	Transistor, An Error Voltage Detector and Over Load Current Limiter
Q601, 602		2SC1815–Y	Transistor, Over Load Current Limiter
Q605 ~ 608		2SD661–S	Transistor, Bias Supply
Q609 ~ 612		2SB745–S	Transistor, Bias Supply
Q613, 614		2SC2632–R	Transistor, Driver
Q615, 616		2SA1124–R	Transistor, Driver
Q617, 618		2SC1913–Q	Transistor, Driver
Q619, 620		2SA913	Transistor, Driver
Q621, 622, ,625, 626		2SD845–R	Transistor, Power Amplifier
Q623, 624, 627 628		2SB755–R	Transistor, Power Amplifier
DIODES			
D101, 102 301 ~ 306, 402 551, 601 ~ 608		**MA162A**	Diode, Bias, Detector and Current Limiter
D307, 308		**MA27A1**	Diode, Bias
D401		LN831RP	Diode, Power Indicator
D403 ~ 410	⚠	**SVDS3V40**	Rectifier
D451		**RVDEQA0106S**	Diode, 6V Zener
D552		**SVDSR1K2**	Diode, Pulse Cancel
D609 ~ 616		**20A90**	Diode, Synchronous Bias Circuit

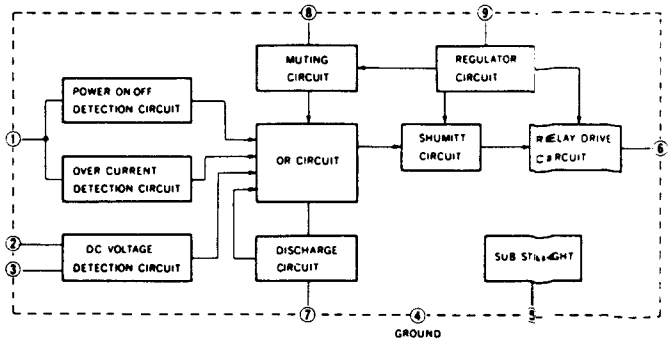
Ref. No.		Part No.	Part Name & Description
COILS and TRANSFORMERS			
L601, 602		SLQY16G–1U	Coil, Choke
T401, 402	⚠	SLT5P195	Transformer, Power Source
VARIABLE RESISTORS			
VR201		EWKK4A090252	Balance Control
VR202		EWI5PA026B15	Volume Control
VR203		EWJFG0090C15	Treble Control
VR204		EWJFBY090530	Bass Control
VR205		EWKGYA086B15	Super Bass Control
VR301, 302		EVMH9GA00B53	DC Balance Adjustment, 5kΩ (B)
VR401		**EVTS0AA00B53**	Voltage Regulator Adjustment, 5kΩ (B)
VR601 ~ 604		EVTR4SA00B13	Clamp Voltage and Icq Adjustment 1kΩ (B)
COMPONENT COMBINATIONS			
Z401, 402		EXRFS203ZS	Component Combination, 0.01μF x 2
THERMISTORS			
TH601, 602		ERTD2FHL103S	Thermister, Thermal Compensation, 10kΩ
FUSES			
F4	⚠	XBA2C05TR0	Fuse, T500mA (250V)
F5, 6, 7, 8	⚠	XBA2C20TR0	Fuse, T2A (250V)
SWITCHES			
S1		ESA26520	Switch, Phono Selector
S2, 3		ESA2682	Switch, Input and Recording Selector
S4, 5, 7, 8		SSL145–1	Switch, Muting, Mode, High Filter and Subsonic Filter
S6		SSL129–1	Switch, Operation
S9		SSH151	Switch, Loudness
S10		SSH275	Switch, Super Bass Turnover
S11		SSR145	Switch, Speakers Selector
S12	⚠	ESL21210S	Switch, Power
S13	⚠	ESE37200	Switch, Voltage Adjuster
LAMP			
PL	⚠	XAMR73S550	Lamp, New Class A Badge, 6.3V, 250mA
RELAY			
RLY1	⚠	SSY19–1	Relay, Muting & Protection

■ BLOCK DIAGRAM OF IC'S

This is the basic block diagram of the inside circuit of IC. In an actual circuit, there may be sometimes idle terminals or some different functions other than the basic circuit.



IC101, 201 (SVINJM4559DS)
Equalizer and tone amplifier
IC202, 203 (AN6552)
Super bass buffer and super bass filter

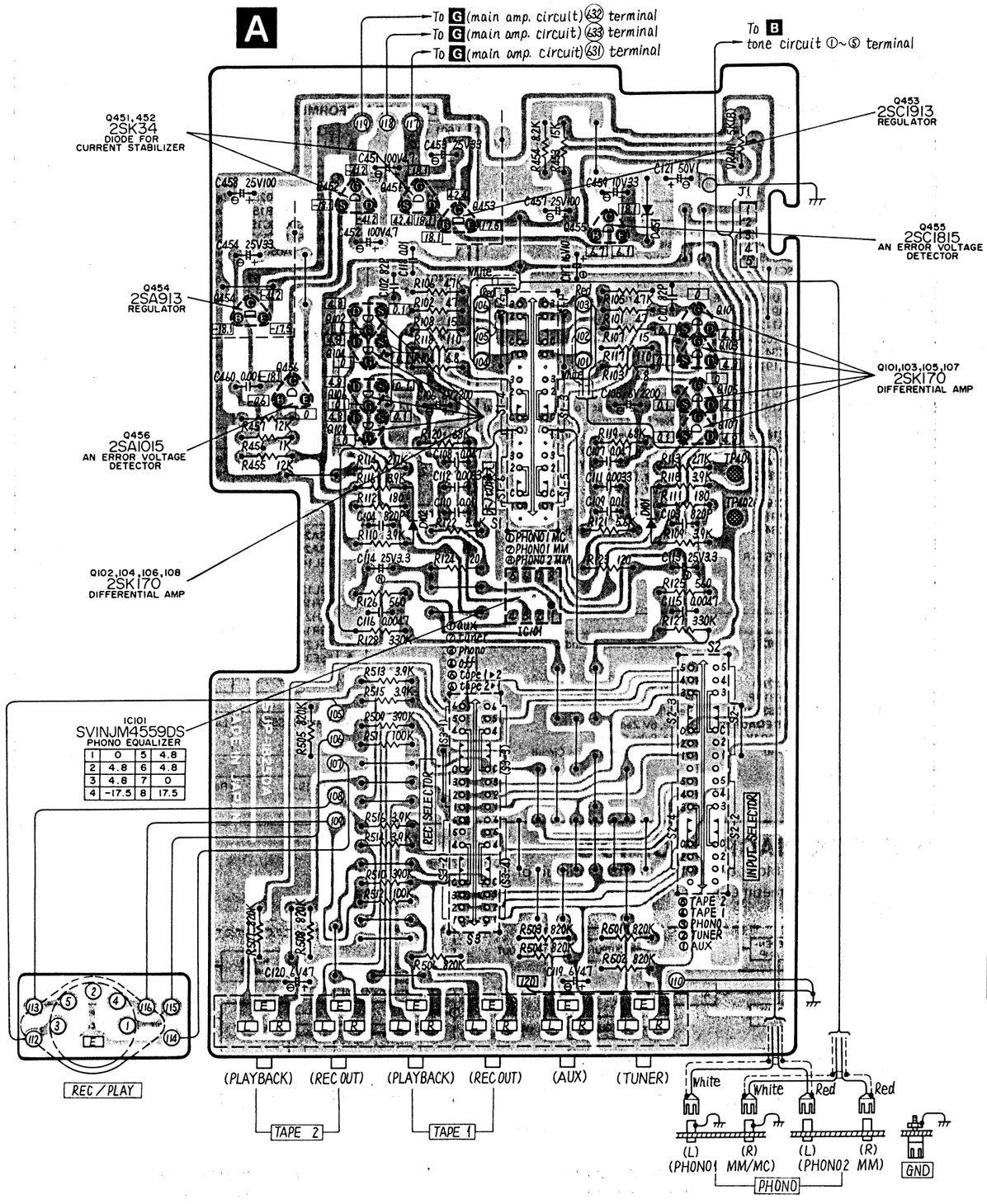


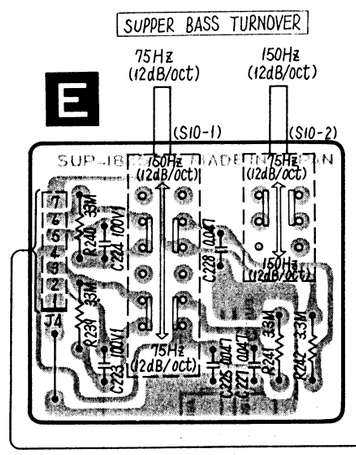
IC551 (SVITA7317P)
Speaker protection

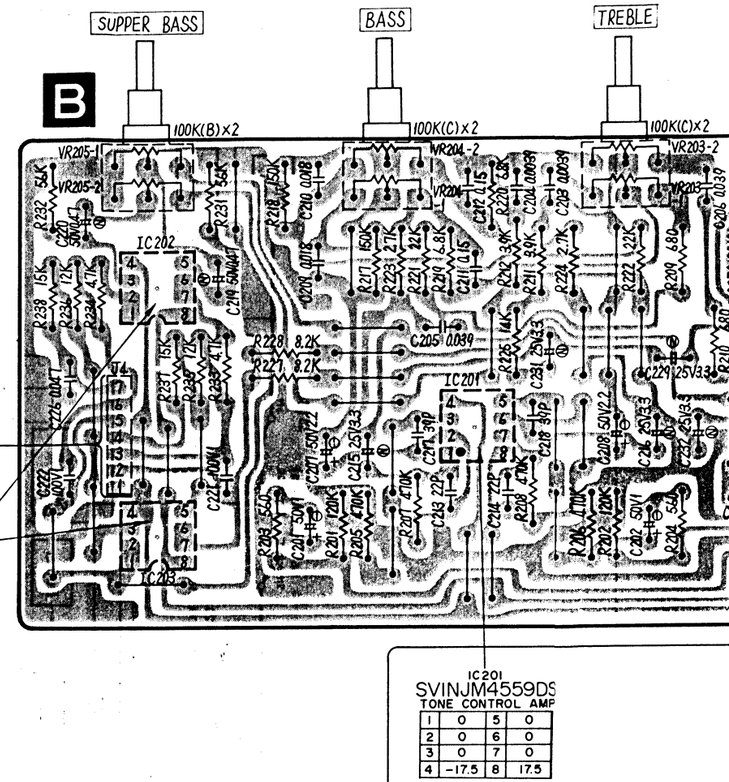
■ PRINTED CIRCUIT BOARD

(A Equalizer/Voltage regulator, B E Tone control circuit, I Power indicator, C Loudness switch, D Volume control
F Pre drive circuit)

GND Earth (Ground) Lines


A
To G (main amp. circuit) (32) terminal
To G (main amp. circuit) (33) terminal
To G (main amp. circuit) (31) terminal
To B tone circuit ①~⑤ terminal
Q451,452 2SK34 DIODE FOR CURRENT STABILIZER
Q453 2SC1913 REGULATOR
Q455 2SC1815 AN ERROR VOLTAGE DETECTOR
Q454 2SA913 REGULATOR
Q101,103,105,107 2SK170 DIFFERENTIAL AMP
Q456 2SA1015 AN ERROR VOLTAGE DETECTOR
Q102,104,106,108 2SK170 DIFFERENTIAL AMP
IC101 SVINJM4559DS PHONO EQUALIZER
1 0 5 4.8
2 4.8 6 4.8
3 4.8 7 0
4 -17.5 8 17.5
REC/PLAY
(PLAYBACK) (REC OUT) (PLAYBACK) (REC OUT) (AUX) (TUNER)
TAPE 2
TAPE 1
(L) (R) (L) (R)
(PHONO1 MM/MC) (PHONO2 MM)
PHONO
GND



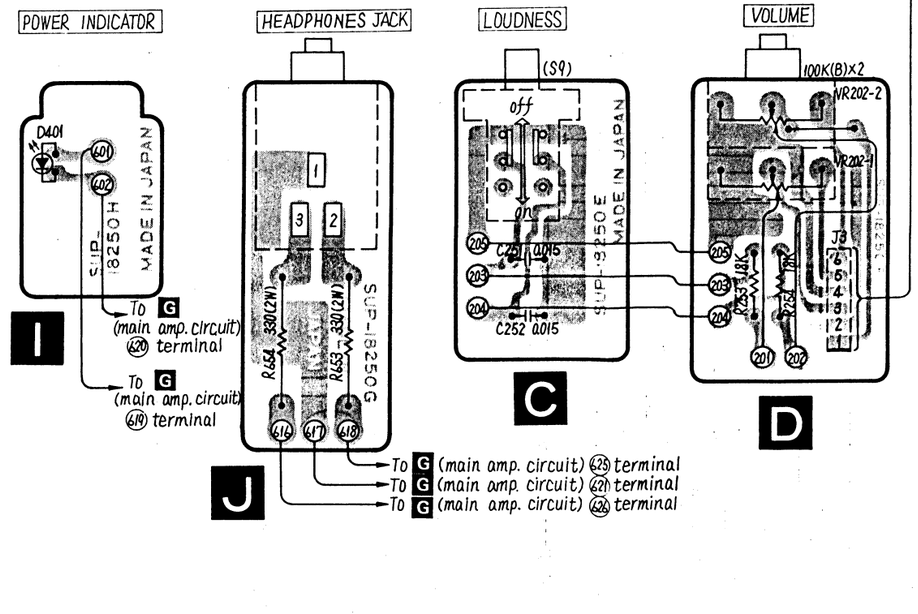


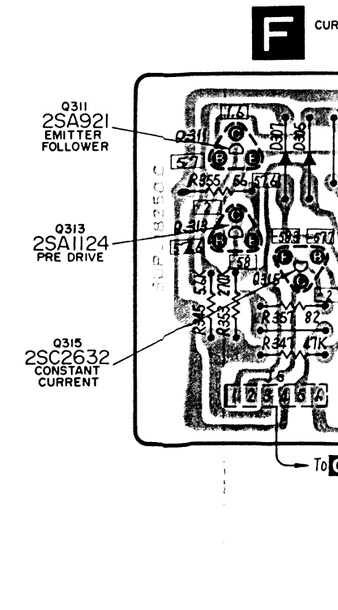
IC202,203
AN6552
SUPER BASS BUFFER

1	0	5	0
2	0	6	0
3	0	7	0
4	-17.5	8	17.5

IC201
SVINJM4559DS
TONE CONTROL AMP

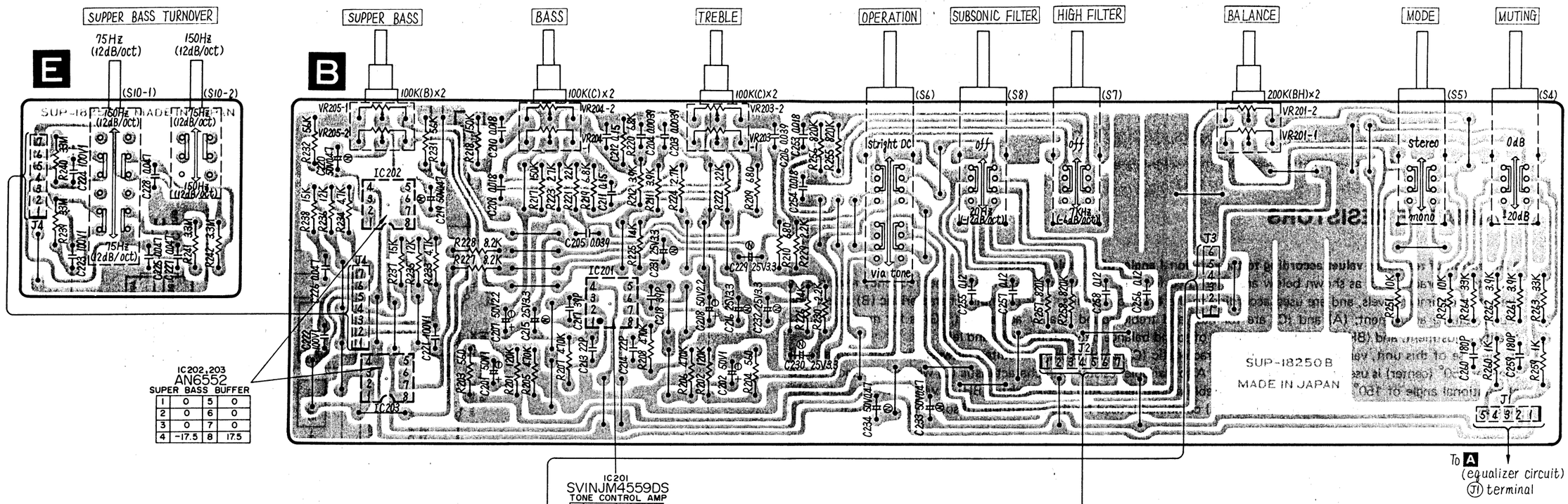
1	0	5	0
2	0	6	0
3	0	7	0
4	-17.5	8	17.5

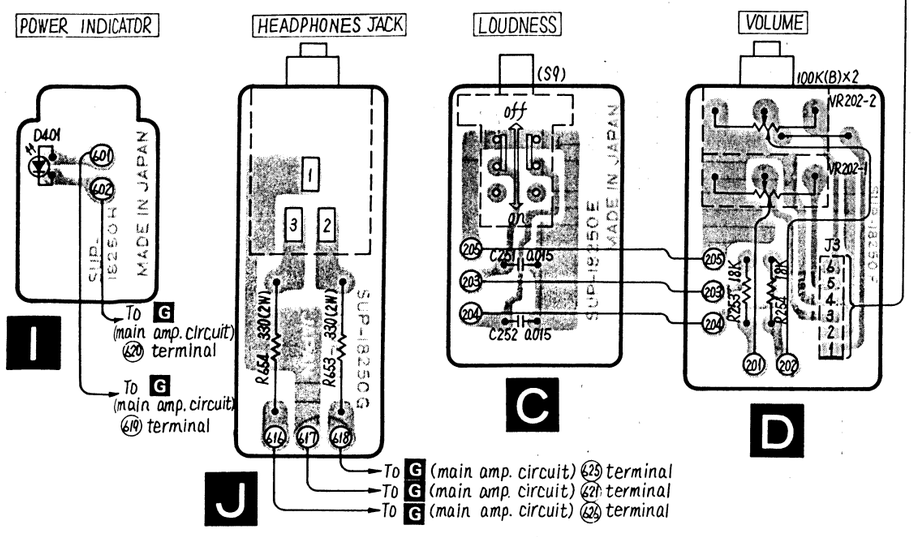


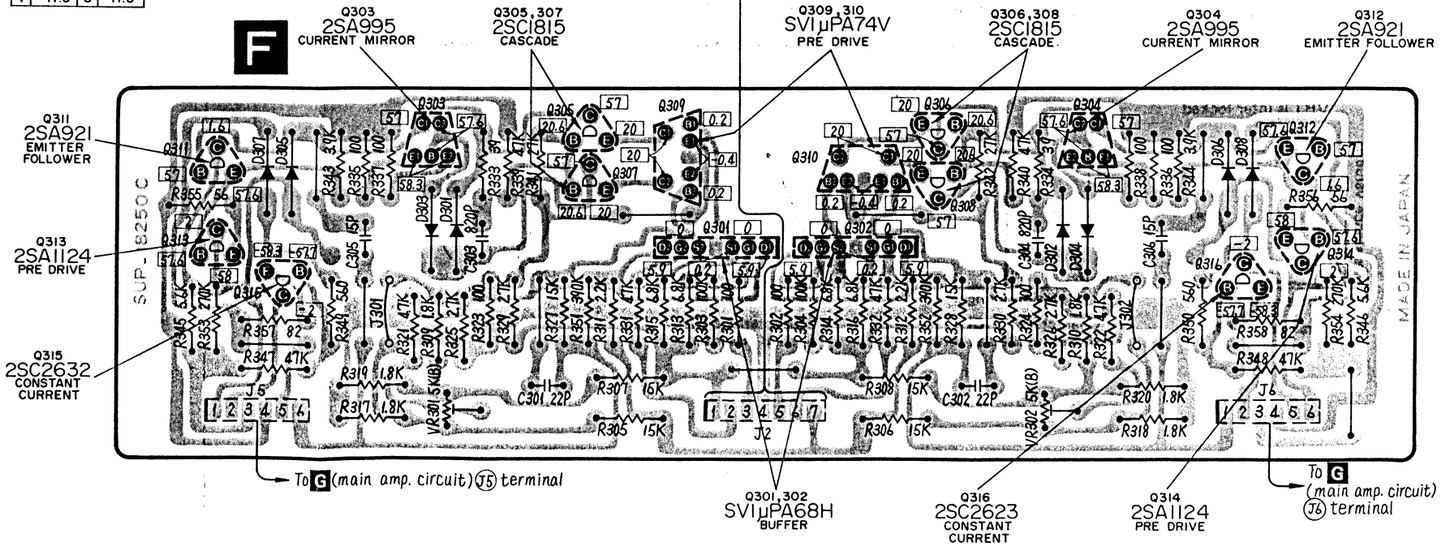


D Volume control

GND Earth (Ground) Lines

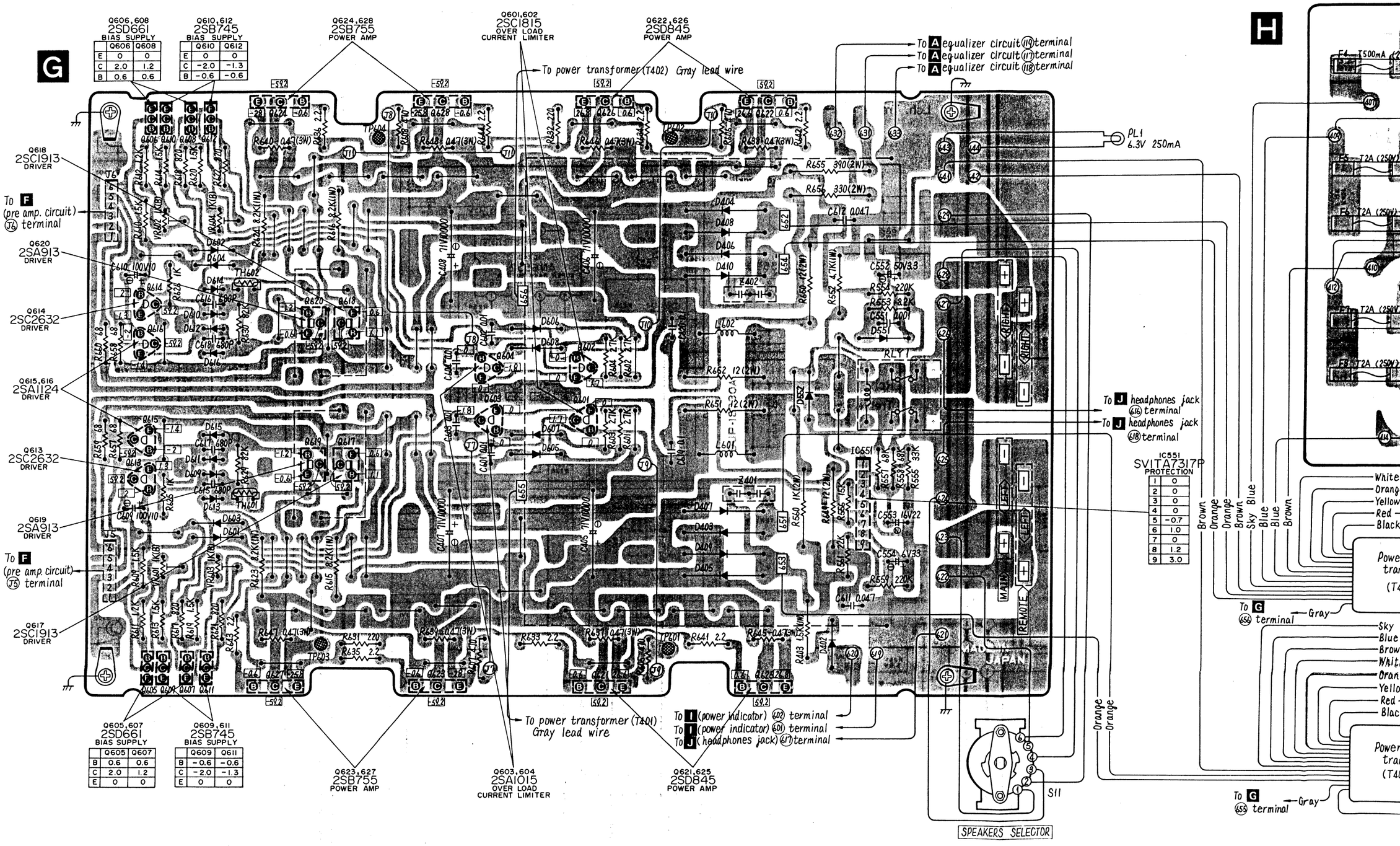






■ PRINTED CIRCUIT BOARD (G Power amplifier drive & synchronous bias circuits, H Power source fuse)

Earth (Ground) Lines


G
H
Q606,608 2SD661 BIAS SUPPLY
Q610,612 2SB745 BIAS SUPPLY
Q624,628 2SB755 POWER AMP
Q601,602 2SC1815 OVER LOAD CURRENT LIMITER
Q622,626 2SD845 POWER AMP
To A equalizer circuit (119) terminal
To A equalizer circuit (117) terminal
To A equalizer circuit (118) terminal
To power transformer (T402) Gray lead wire
PL1 6.3V 250mA
Q618 2SC1913 DRIVER
To F (pre amp. circuit) (J6) terminal
Q620 2SA913 DRIVER
Q614 2SC2632 DRIVER
Q615,616 2SA1124 DRIVER
Q613 2SC2632 DRIVER
Q619 2SA913 DRIVER
To F (pre amp. circuit) (J5) terminal
Q617 2SC1913 DRIVER
To J headphones jack (616) terminal
To J headphones jack (618) terminal
IC551 SVITA7317P PROTECTION
Q605,607 2SD661 BIAS SUPPLY
Q609,611 2SB745 BIAS SUPPLY
Q623,627 2SB755 POWER AMP
Q603,604 2SA1015 OVER LOAD CURRENT LIMITER
Q621,625 2SD845 POWER AMP
To power transformer (T401) Gray lead wire
To I (power indicator) (602) terminal
To I (power indicator) (601) terminal
To J (headphones jack) (617) terminal
To G (655) terminal Gray
To G (656) terminal Gray
SPEAKERS SELECTOR
S11
MADE IN JAPAN

Q606	Q608
E 0	0
C 2.0	1.2
B 0.6	0.6

Q610	Q612
E 0	0
C -2.0	-1.3
B -0.6	-0.6

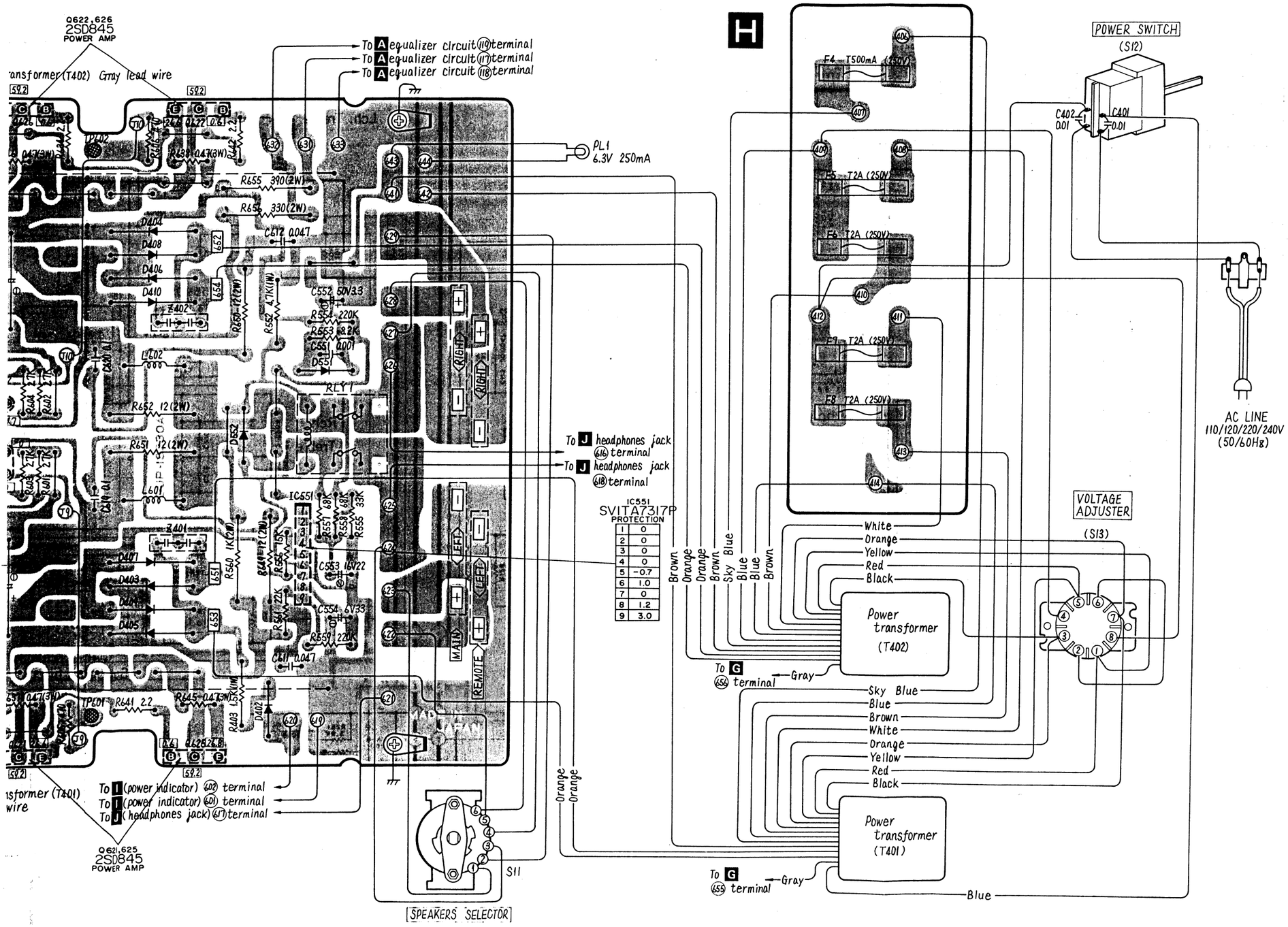
IC551	
1	0
2	0
3	0
4	0
5	-0.7
6	1.0
7	0
8	1.2
9	3.0

Q605	Q607
B 0.6	0.6
C 2.0	1.2
E 0	0

Q609	Q611
B -0.6	-0.6
C -2.0	-1.3
E 0	0

Power source fuse)

Earth (Ground) Lines



■ TERMINAL GUIDE OF TRANSISTOR AND IC'S

SVINJM4559DS	AN6552
SVITA7317P	2SK170
SV1μPA68H	2SA995N
2SC1815 , 2SA921 2SA1124 , 2SC2632 2SA1015 , 2SC1815 2SC2632 , 2SA1124	SV1μPA74V
2SK34	2SC1913 , 2SA913
2SD661 , 2SB745	2SD845 , 2SB755

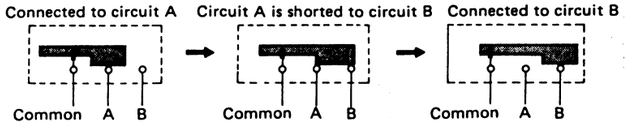
■ SCHEMATIC DIAGRAM..... MODEL SU-V8

(This schematic diagram may be modified at any time with the development of new technology.)

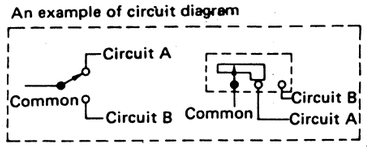
Shorting Switch

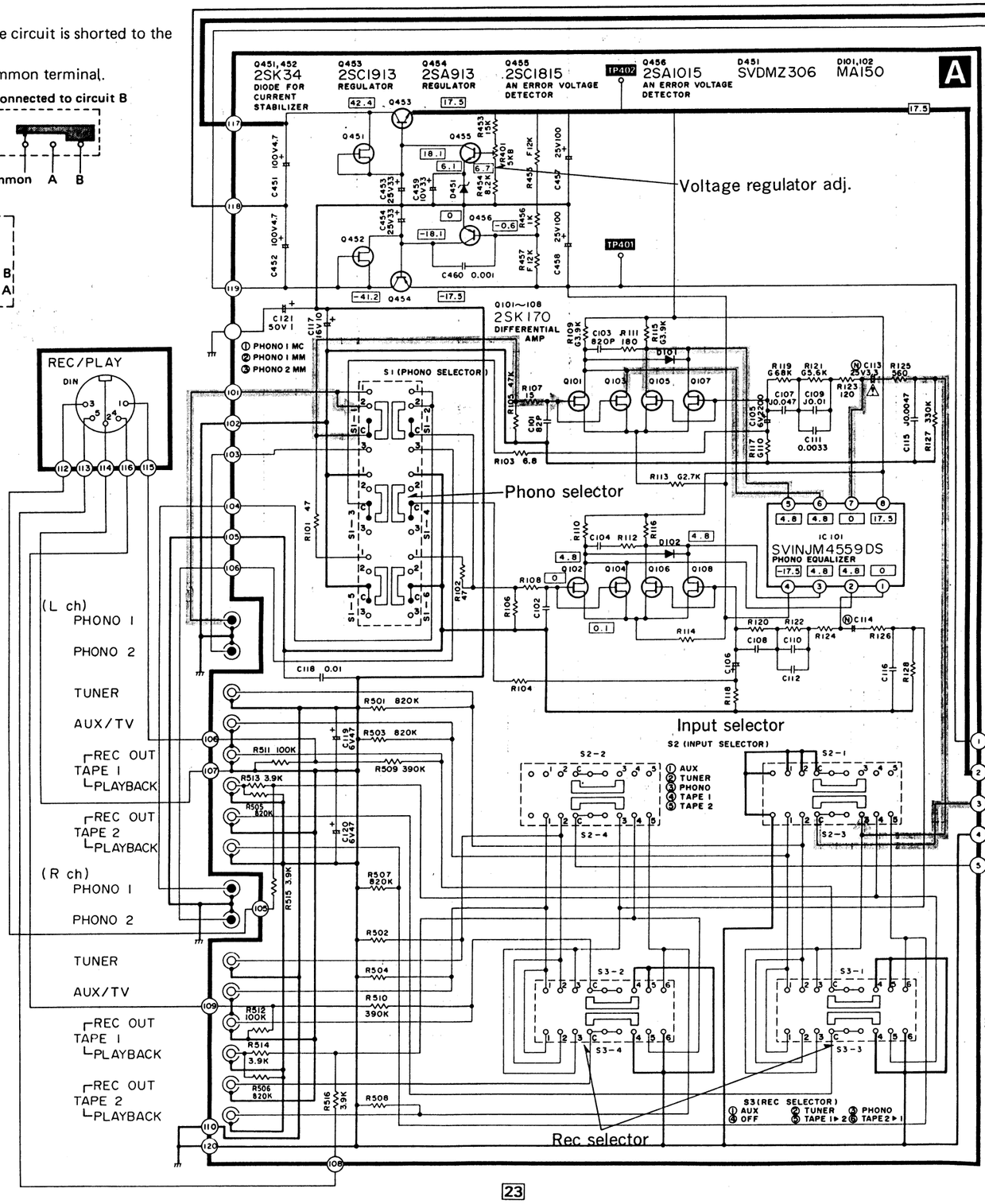
This unit uses a shorting switch. As illustrated below, the circuit is shorted to the next circuit without being opened.

In the circuit diagram, the shaded area represents the common terminal.

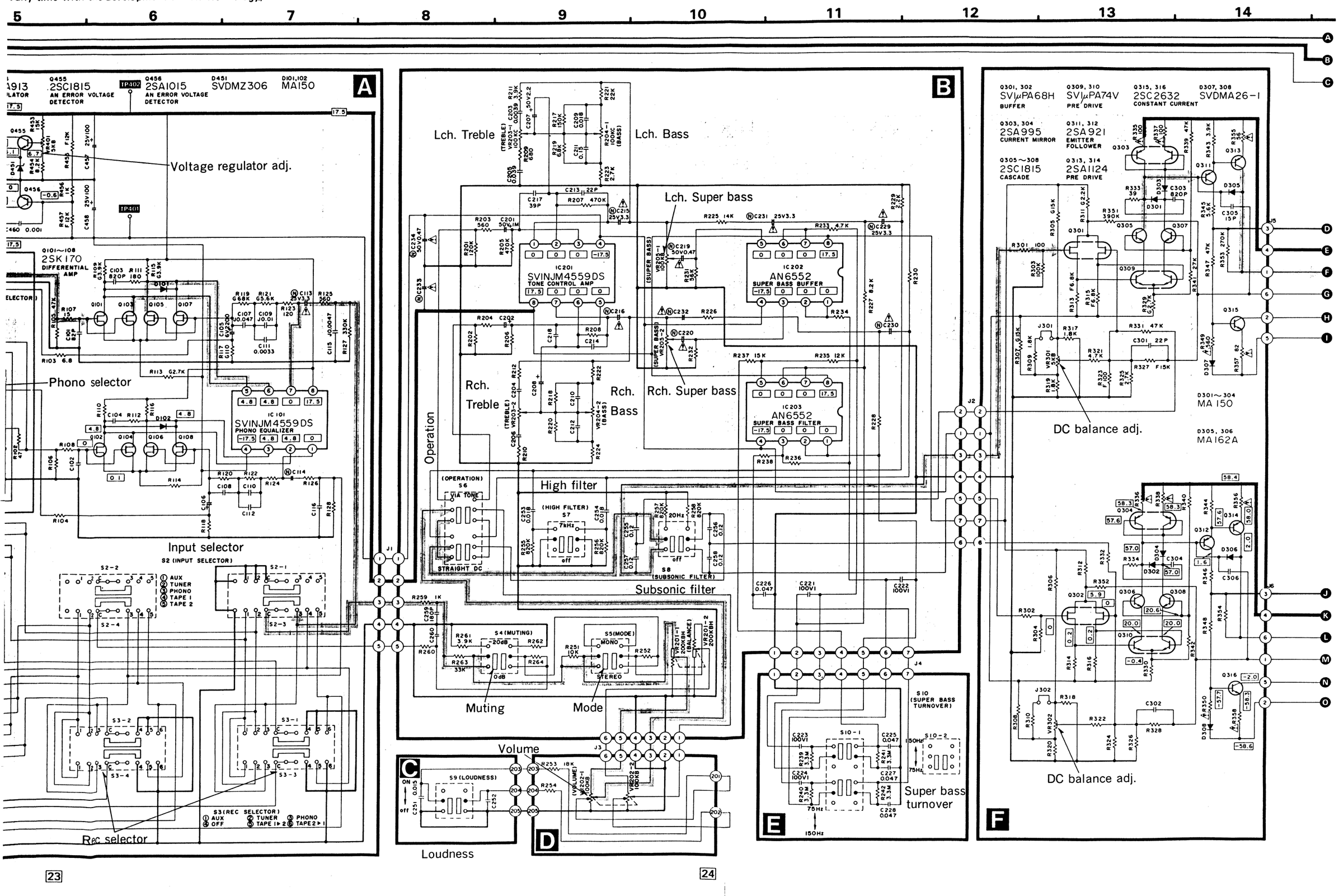


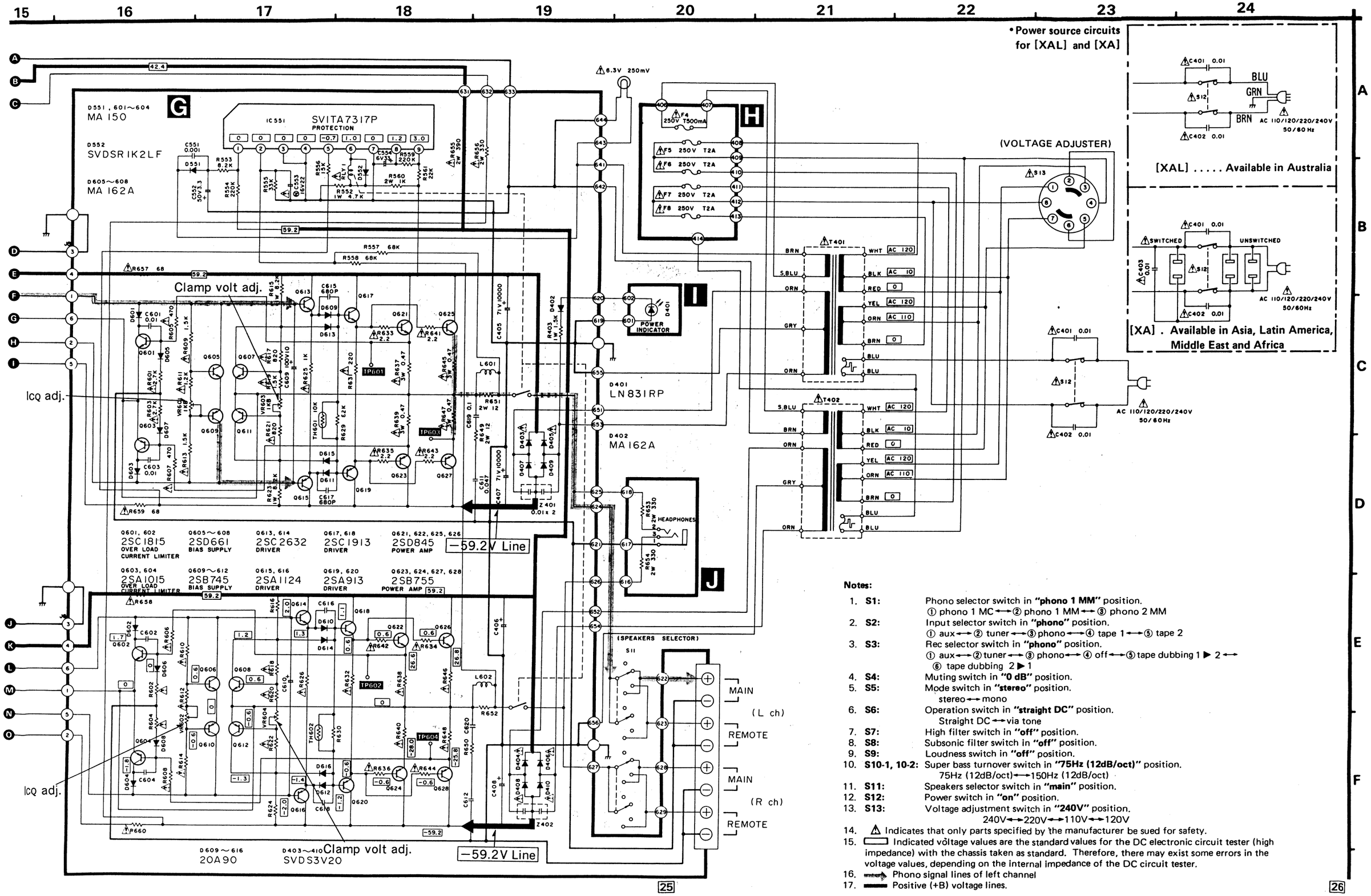
An example of circuit diagram





it any time with the development of new technology.)

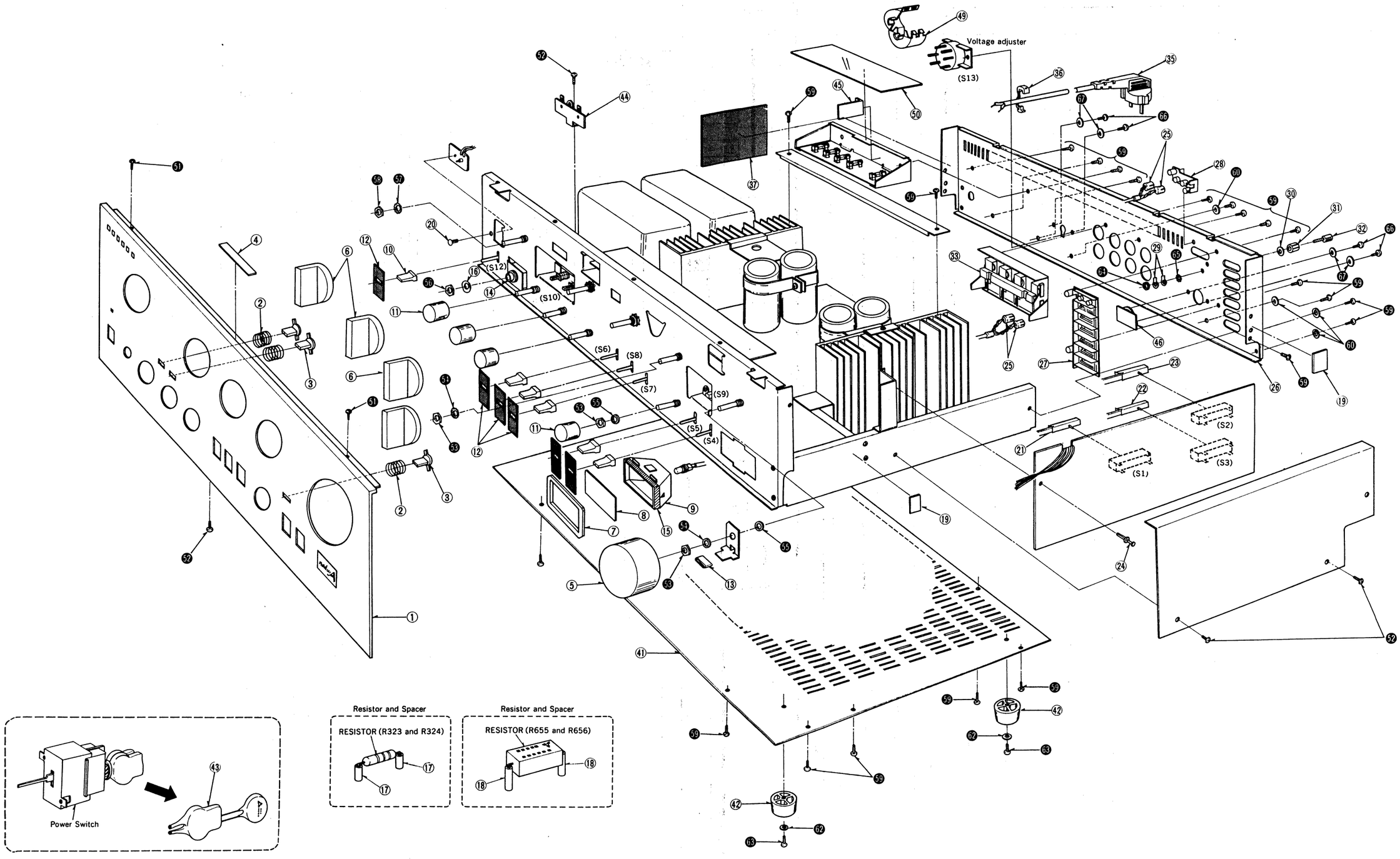




Notes:

1. **S1:** Phono selector switch in **"phono 1 MM"** position.
   ① phono 1 MC ⟷ ② phono 1 MM ⟷ ③ phono 2 MM
2. **S2:** Input selector switch in **"phono"** position.
   ① aux ⟷ ② tuner ⟷ ③ phono ⟷ ④ tape 1 ⟷ ⑤ tape 2
3. **S3:** Rec selector switch in **"phono"** position.
   ① aux ⟷ ② tuner ⟷ ③ phono ⟷ ④ off ⟷ ⑤ tape dubbing 1 ▶ 2 ⟷ ⑥ tape dubbing 2 ▶ 1
4. **S4:** Muting switch in **"0 dB"** position.
5. **S5:** Mode switch in **"stereo"** position.
   stereo ⟷ mono
6. **S6:** Operation switch in **"straight DC"** position.
   Straight DC ⟷ via tone
7. **S7:** High filter switch in **"off"** position.
8. **S8:** Subsonic filter switch in **"off"** position.
9. **S9:** Loudness switch in **"off"** position.
10. **S10-1, 10-2:** Super bass turnover switch in **"75Hz (12dB/oct)"** position.
    75Hz (12dB/oct) ⟷ 150Hz (12dB/oct)
11. **S11:** Speakers selector switch in **"main"** position.
12. **S12:** Power switch in **"on"** position.
13. **S13:** Voltage adjustment switch in **"240V"** position.
    240V ⟷ 220V ⟷ 110V ⟷ 120V
14. ⚠ Indicates that only parts specified by the manufacturer be sued for safety.
15. ▭ Indicated voltage values are the standard values for the DC electronic circuit tester (high impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
16. ⟿ Phono signal lines of left channel
17. ▬ Positive (+B) voltage lines.

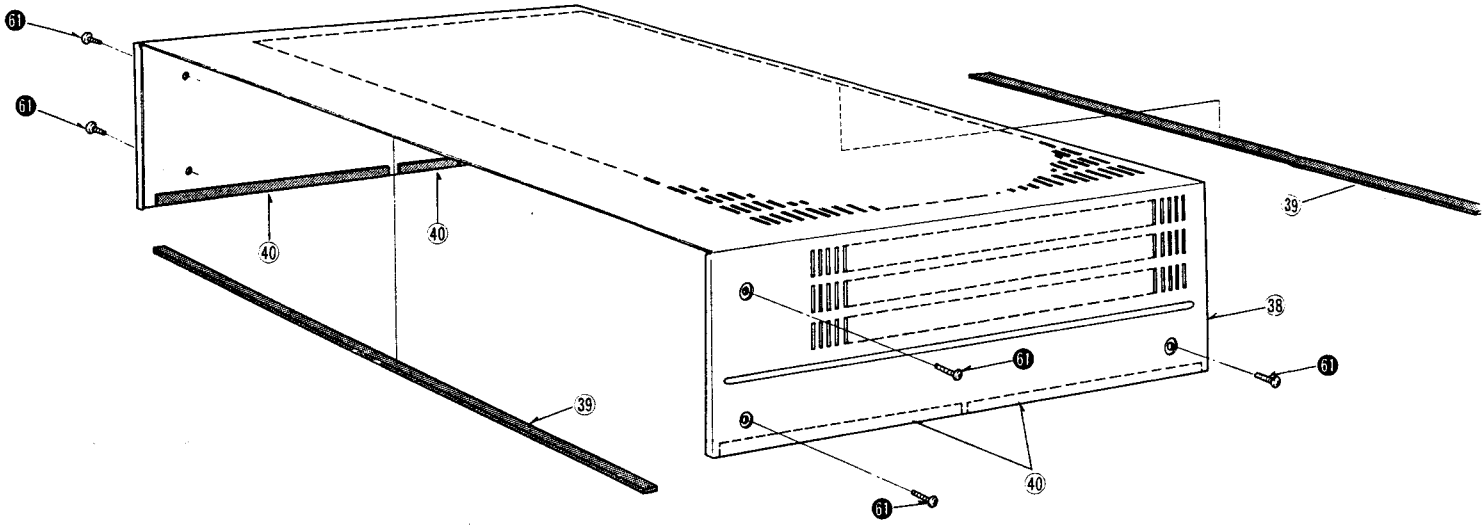
■ EXPLODED VIEW



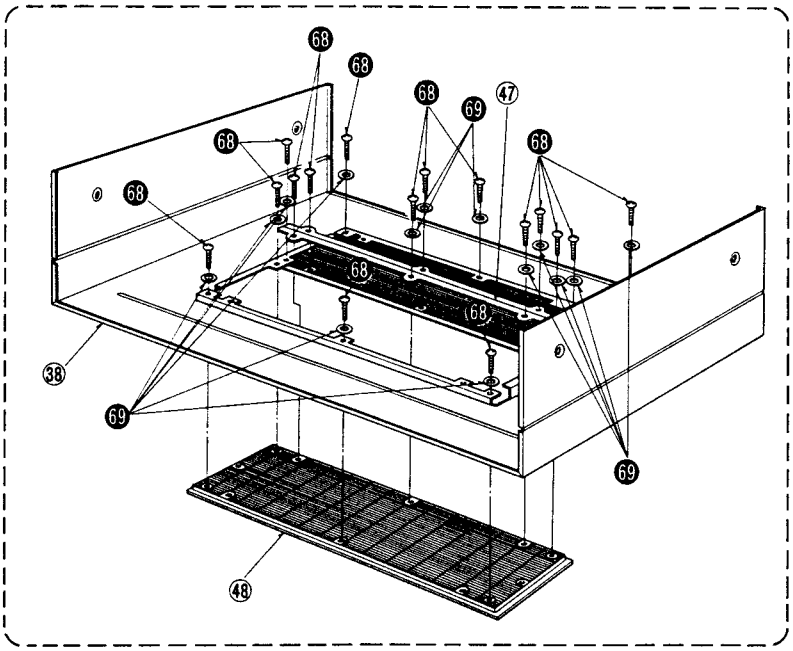
Resistor and Spacer

Resistor and Spacer

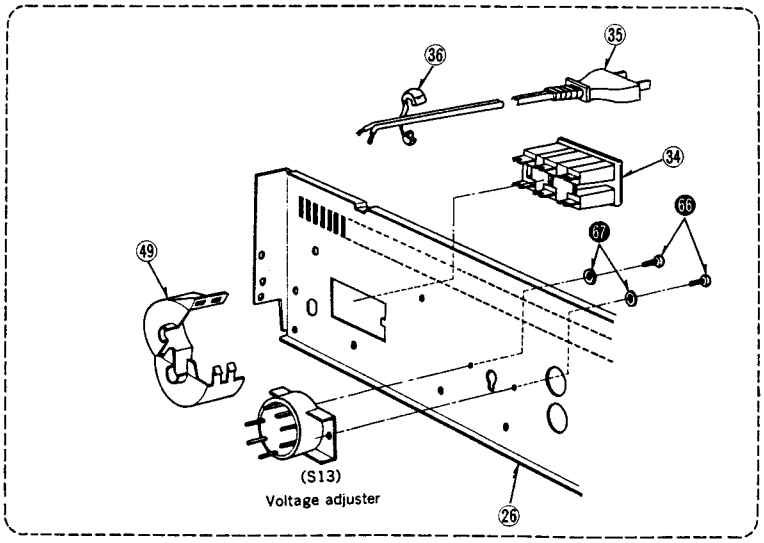
• **Cabinet**



(This Cabinet is available in SU-V8 [XE] only.)



(Rear Panel and AC Outlet) . . . . for [XA]
[XA] is available in Asia, Latin America, Middle East and Africa



■ REPLACEMENT PARTS LIST (Cabinet and Chassis Parts)

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. ⚠ indicates that only parts specified by the manufacturer be used for safety.
3. [K]-marked parts are used for black type only, while O-marked parts are for silver type only.
4. Parts other than [K] and O-marked are used for both black and silver types.
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Black type model No. SU-V4 (K)

Ref. No.		Part No.	Part Name & Description
CABINET and CHASSIS PARTS			
1	O	SYW251–2	Panel, Front Ass'y
1	K	SYW251–3	Panel, Front Ass'y
2		SUS187	Spring, Push Switch Buttons
3	O	SBC259	Button, Push Switch
3	K	SBC259–1	Button, Push Switch
4		SHG6063–1	Rubber, Magnet
5	O	SBN855–1	Knob, Volume Control
5	K	SBN899	Knob, Volume Control (Black)
6	O	SBN857	Knob, Speakers, Rec Selector, Input Selector and Phono Selector
6	K	SBN901	Knob, Speakers, Rec Selector, Input Selector and Phono Selector (Black)
7		SHG6089	Cover, New Class A Badge
8	O	SDE253	Filter, New Class A Badge
8	K	SDE253–1	Filter, New Class A Badge
9		SMP281	Holder, New Class A Badge
10	O	SBD27	Knob, Lever Switches
10	K	SBD27–1	Knob, Lever Switches
11	O	SBN853	Knob, Balance, Treble, Bass and Super Bass
11	K	SBN897	Knob, Balance, Treble, Bass and Super Bass
12	O	SHR5049	Cover, Lever Switch Knobs
12	K	SHR5049–1	Cover, Lever Switch Knobs
13		SHG515	Cushion, Volume Stopper (Rubber)
14		XCJ6P21B–A	Jack, Headphones
15		SHS6111	Fiber, New Class A Badge
16		SNE59–1	Washer, Wave Type (Headphone Jack)
17		SMX51–1	Spacer, Resistor
18		SMX51	Spacer, Resistor
19		SHG6051	Fiber
20		SHRA916–2	Latch, Power Indicator P.C.B. M'tg
21		ESA3353B	Remote Control, Phono Selector
22		ESA3351B	Remote Control, Rec Selector
23		ESA3352B	Remote Control, Input Selector
24		SHR401–1	Latch, Equalizer P.C.B. M'tg
25		SJP1103	Pin Plug, Phono Input Connection
26 [D, XSW]		SGP2130–1A	Rear Panel
26 [DG, EB, XGH, XGF, XE]		SGPUV8E	Rear Panel, SGP2130–1A with Name Plate (SGT22130)
26 [XAL]		SGPUV8L	Rear Panel, SGP2130–3A with Name Plate (SGT22150)
26 [XA]		SGP2130–2A	Rear Panel
27		SJF2043SAN	Terminal, Input
28		SJF2225SN	Terminal, Phono 2
29		SJT201	Terminal, Ground 1 Pin
30		SNTA421	Washer, Earth Terminal
31		SNE4017	Terminal, Earth (Ground)
32		SNEA204–2S	Terminal, Earth (Ground)
33		SJF5807–1	Terminal, Speakers
34 [XA] only	⚠	SJS601–1	Socket, AC Outlet
35 [D, DG, EB, XGH, XGF, XA]	⚠	SJA97	AC Cord, Power
35 [XSW]	⚠	SJA111	AC Cord, Power
35 [XE]	⚠	RJA45ZC	AC Cord, Power
35 [XAL]	⚠	QFC1207M	AC Cord, Power
36		SFSR4N4	Bushing, AC Cord
36 [XE] only		SFSR5N4	Bushing, AC Cord
36 [XAL] only		SHR131	Bushing, AC Cord
37		SMX275–2	Plate, Lead Wire Protection
38	O	SKC230H	Cabinet
38 [XE] only	O	SKC230H2	Cabinet
38	K	SKC230B	Cabinet (Black)
38 [XE] only	K	SKC230B2	Cabinet (Black)
39		SHS1009	Fiber, Cabinet
40		SHS6111	Fiber, Cabinet
41		SKU8210	Bottom Board
42		SKLA7–1	Foot
43		SMXA65	Cover, Capacitor
44		SJR205	Terminal Strip, 2P
45 [XE,XAL] only		SMX363	Cover, Fuse P.C.B.
46		SJS6509	Socket, DIN
47 [XE] only		SUW1475	Metal Fitting (Addition only products for [XE])
48 [XE] only		SGS491–2	Ventilation (Addition only products for [XE])
49		SUV453	Cover, Voltage Adjuster
50		SMX349	Cover, Fuse P.C.B.
SCREWS, NUTS and WASHERS			
51		**XTS3+8B**	Screw, Tapping, ⊕ 3 x 8 (Front Panel)
52		**XTB3+8B**	Screw, Tapping, ⊕ 3 x 8 (Front Panel, Shild Plate)
53		**XNS8**	Nut, M8 (Super Bass, Treble, Balance, Rec Selector, Input Selector and Phono Selector)
54		**XWC8B**	Nut, φ 8 (Phono Selector, Input Selector and Rec Selector)
55		**XWC9B**	Nut, φ 9 (Volume, Balance, Treble, Bass and Super Bass)
56		**XNS12**	Nut, M12 (Headphones Jack)
57		**XWV9**	Washer, φ 9 (Speakers Selector)
58		**XNS9**	Nut, M9 (Speakers Selector)
59		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8 (Rear Panel, Terminals and Bottom Board)
60		**XWC3B**	Washer, Toothed Lock, φ 3 (Rear Panel)
61	O	**XTB4+8BFN**	Screw, Tapping, ⊕ 4 x 8 (Cabinet)
61	K	**XTB4+8FFZ**	Screw, Tapping, ⊕ 4 x 8 (Cabinet)
62		**XWG3**	Washer, Plain, φ 3 (Feet M'tg)
63		**XTV3+10BFN**	Screw, Tapping, ⊕ 3 x 10 (Feet)
64		**XNG4ES**	Nut, M4 (Ground Terminal)
65		**XWC4B**	Washer, Toothed Lock φ 4
66		**XSN3+6BVS**	Screw, ⊕ 3 x 6 (Voltage Adjuster, DIN Socket
67		**XWA3BFZ**	Washer, φ 3 (Voltage Adjuster, DIN Socket)
68 [XE] only		**XSN3+6BVS**	Screw, ⊕ 3 x 6 (Ventilation)
69 [XE] only		**XWA3BFZ**	Washer, φ 3 (Ventilation)
ACCESSORIES			
A1 [XA] only	⚠	SJP5213–1	Plug Adaptor, AC Power
A2 [XA] only	⚠	SJP5215	Plug Adaptor, AC Power
PACKING PARTS			
P1		SPP653	Polyethylene Bag
P2 [XSW,XE] only		SPS2501–1	Pad, Left Side
P2		SPS2501–2	Pad, Left Side
P3 [XSW,XE] only		SPS2503–1	Pad, Right Side
P3		SPS2503–2	Pad, Right Side
P4		SPG2583	Carton Box
P4 [XSW, XE]		SPG2585	Carton Box
P4 [XGF]		SGP2587	Carton Box
P5		SQF10411	Instructions Book, Printed Matter
P5 [XA] only		SQF10559	Instructions Book, Printed Matter

Areas

* [D] and [DG] are available in Scandinavia and European except Belgium, United Kingdom, Switzerland, Holland and France.
* [EB] is available in Belgium.
* [XE] is available in United Kingdom.
* [XSW] is available in Switzerland.
* [XGH] is available in Holland.
* [XGF] is available in France.
* [XAL] is available in Australia.
* [XA] is available in Asia, Latin America, Middle East and Africa.

■ RESISTOR AND CAPACITOR PARTS LIST

Note: ⚠ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.		Part No.	Part Name & Description
RESISTORS			
R101, 102		**ERO25CKF4750**	Carbon, 47.5Ω, 1/4W, ± 1%
R103, 104		**ERD25FJ6R8**	Carbon, 6.8Ω, 1/4W, ± 5%
R105, 106		**ERO25CKF4702**	Carbon, 47kΩ, 1/4W, ± 1%
R107, 108		**ERO25CKF15R0**	Carbon, 15Ω, 1/4W, ± 1%
R109, 110		**ERO25CKF3901**	Metal Film, 3.9kΩ, 1/4W, ± 2%
R111, 112		**ERD25FJ181**	Carbon, 180Ω, 1/4W, ± 5%
R113, 114		**ERO25CKF2701**	Metal Film, 2.7kΩ, 1/4W, ± 1%
R115, 116		**ERO25CKF3901**	Metal Film, 3.9kΩ, 1/4W, ± 1%
R117, 118		**ERO25CKF1100**	Metal Film, 110Ω, 1/4W, ± 1%
R119, 120		**ERO25CKF6802**	Metal Film, 68kΩ, 1/4W, ± 1%
R121, 122		**ERO25CKF5601**	Metal Film 5.6kΩ, 1/4W, ± 1%
R123, 124		**ERO25CKF1200**	Carbon, 120Ω, 1/4W, ± 1%
R125, 126		**ERD25FJ561**	Carbon, 560Ω, 1/4W, ± 5%
R127, 128		**ERD25TJ334**	Carbon 330kΩ, 1/4W, ± 5%
R201, 202		**ERD25TJ124**	Carbon, 120kΩ, 1/4W, ± 5%
R203, 204		**ERD25FJ561**	Carbon, 560Ω, 1/4W, ± 5%
R205, 206		**ERD25TJ474**	Carbon, 470kΩ, 1/4W, ± 5%
R207, 208		**ERD25TJ474**	Carbon, 470kΩ, 1/4W, ± 5%
R209, 210		**ERD25FJ681**	Carbon, 680Ω, 1/4W, ± 5%
R211, 212		**ERD25FJ392**	Carbon, 3.9kΩ, 1/4W, ± 5%
R217, 218		**ERD25TJ154**	Carbon, 150kΩ, 1/4W, ± 5%
R219, 220		**ERD25FJ682**	Carbon, 6.8kΩ, 1/4W, ± 5%
R221, 222		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ± 5%
R223, 224		**ERD25FJ272**	Carbon, 2.7kΩ, 1/4W, ± 5%
R225, 226		**ERO25CKF1402**	Metal Film, 14kΩ, 1/4W, ± 5%
R227, 228		**ERD25FJ822**	Carbon, 8.2kΩ, 1/4W, ± 5%
R229, 230		**ERD25FJ222**	Carbon, 2.2kΩ, 1/4W, ± 5%
R231, 232		**ERD25TJ563**	Carbon, 56kΩ, 1/4W, ± 5%
R233, 234		**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R235, 236		**ERD25TJ123**	Carbon, 12kΩ, 1/4W, ± 5%
R237, 238		**ERD25TJ153**	Carbon, 15kΩ, 1/4W, ± 5%
R239, 240		**ERC14GK335**	Solid, 3.3MΩ, 1/4W, ±10%
R241, 242		**ERC14GK335**	Solid, 3.3MΩ, 1/4W, ±10%
R251, 252		**ERD25FJ103**	Carbon, 10kΩ, 1/4W, ± 5%
R253, 254		**ERD25TJ183**	Carbon, 18kΩ, 1/4W, ± 5%
R255, 256		**ERD25TJ824**	Carbon, 820kΩ, 1/4W, ± 5%
R257, 258		**ERD25TJ824**	Carbon, 820kΩ, 1/4W, ± 5%
R259, 260		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R261, 262		**ERD25FJ392**	Carbon, 3.9kΩ, 1/4W, ± 5%
R263, 264		**ERD25TJ333**	Carbon, 33kΩ, 1/4W, ± 5%
R301, 302		**ERD25FJ101**	Carbon, 100Ω, 1/4W, ± 5%
R303, 304		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ± 5%
R305, 306		**ERO25CKF1502**	Metal Film 15kΩ, 1/4W, ± 1%
R307, 308		**ERO25CKF1502**	Metal Film, 15kΩ, 1/4W, ± 1%
R309, 310		**ERD25FJ182**	Carbon, 1.8kΩ, 1/4W, ± 5%
R311, 312		**ERO25CKF2201**	Metal Film, 2.2kΩ, 1/4W, ± 2%
R313, 314		**ERO25CKF6801**	Metal Film, 6.8kΩ, 1/4W, ± 1%
R315, 316		**ERO25CKF6801**	Metal Film, 6.8kΩ, 1/4W, ± 1%
R317, 318		**ERD25FJ182**	Carbon, 1.8kΩ, 1/4W, ± 5%
R319, 320		**ERD25FJ182**	Carbon, 1.8kΩ, 1/4W, ± 5%
R321, 322		**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R323, 324		**ERO25CKF1000**	Metal Film, 100Ω, 1/4W, ± 1%
R325, 326		**ERD25FJ272**	Carbon, 2.7kΩ, 1/4W, ± 5%
R327, 328		**ERO25CKF1502**	Metal Film, 15kΩ, 1/4W, ± 1%
R329, 330		**ERO25CKF2701**	Metal Film, 2.7kΩ, 1/4W, ± 2%
R331, 332		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ± 5%
R333, 334		**ERD25FJ390**	Carbon, 39Ω, 1/4W, ± 5%
R335, 336	⚠	**ERD25FJ101**	Carbon, 100Ω, 1/4W, ± 5%
R337, 338	⚠	**ERD25FJ101**	Carbon, 100Ω, 1/4W, ± 5%
R339, 340		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ± 5%
R341, 342		**ERD25TJ273**	Carbon, 27kΩ, 1/4W, ± 5%
R343, 344		**ERD25FJ392**	Carbon, 3.9kΩ, 1/4W, ± 5%
R345		**ERD25FJ562**	Carbon, 5.6kΩ, 1/4W, ± 5%
R346		**ERD25FJ562**	Carbon, 5.6kΩ, 1/4W, ± 5%
R347, 348		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ± 5%
R349, 350	⚠	**ERD25FJ561**	Carbon, 560Ω, 1/4W, ± 5%
R351, 352		**ERD25TJ394**	Carbon, 390kΩ, 1/4W, ± 5%
R353, 354		**ERD25TJ274**	Carbon, 270kΩ, 1/4W, ± 5%
R355, 356	⚠	**ERD25FJ560**	Carbon, 56Ω, 1/4W, ± 5%
R357, 358	⚠	**ERD25FJ820**	Carbon, 82Ω, 1/4W, ± 5%
R403		**ERG1ANJ152**	Metal Oxide, 1.5kΩ, 1W, ± 5%
R453		**ERD25TJ153**	Carbon, 15kΩ, 1/4W, ± 5%
R454		**ERD25FJ822**	Carbon, 8.2kΩ, 1/4W, ± 5%
R455		**ERO25CKF1202**	Metal Film, 12kΩ, 1/4W, ± 1%
R456		**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%

Ref. No.		Part No.	Part Name & Description
R457		**ERO25CKF1202**	Metal Film, 12kΩ, 1/4W, ± 1%
R501, 502		**ERD25TJ824**	Carbon, 820kΩ, 1/4W, ± 5%
R503, 504		**ERD25TJ824**	Carbon, 820kΩ, 1/4W, ± 5%
R505, 506		**ERD25TJ824**	Carbon, 820kΩ, 1/4W, ± 5%
R507, 508		**ERD25TJ824**	Carbon, 820kΩ, 1/4W, ± 5%
R509, 510		**ERD25TJ394**	Carbon, 390kΩ, 1/4W, ± 5%
R511, 512		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ± 5%
R513, 514		**ERD25FJ392**	Carbon, 3.9kΩ, 1/4W, ± 5%
R515, 516		**ERD25FJ392**	Carbon, 3.9kΩ, 1/4W, ± 5%
R552		**ERG1ANJ472**	Metal Oxide, 4.7kΩ, 1W, ± 5%
R553		**ERD25FJ822**	Carbon, 8.2kΩ, 1/4W, ± 5%
R554		**ERD25TJ224**	Carbon, 220kΩ, 1/4W, ± 5%
R555		**ERD25TJ333**	Carbon, 33kΩ, 1/4W, ± 5%
R556		**ERD25TJ153**	Carbon, 15kΩ, 1/4W, ± 5%
R557, 558		**ERD25TJ683**	Carbon, 68kΩ, 1/4W, ± 5%
R559		**ERD25TJ224**	Carbon, 220kΩ, 1/4W, ± 5%
R560		**ERG2ANJ102**	Metal Oxide, 1kΩ, 2W, ± 5%
R561		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ± 5%
R601, 602	⚠	**ERD25FJ272**	Carbon, 2.7kΩ, 1/4W, ± 5%
R603, 604	⚠	**ERD25FJ272**	Carbon, 2.7kΩ, 1/4W, ± 5%
R605, 606	⚠	**ERD25FJ471**	Carbon, 470Ω, 1/4W, ± 5%
R607, 608	⚠	**ERD25FJ471**	Carbon, 470Ω, 1/4W, ± 5%
R609, 610	⚠	**ERD25TJ152**	Carbon, 1.5kΩ, 1/4W, ± 5%
R611, 612	⚠	**ERD25FJ122**	Carbon, 1.2kΩ, 1/4W, ± 5%
R613, 614	⚠	**ERD25FJ152**	Carbon, 1.5kΩ, 1/4W, ± 5%
R615, 616		**ERG1ANJ822**	Metal Oxide, 8.2kΩ, 1W, ± 5%
R617, 618	⚠	**ERD25FJ821**	Carbon, 820Ω, 1/4W, ± 5%
R619, 620	⚠	**ERD25FJ152**	Carbon, 1.5kΩ, 1/4W, ± 5%
R621, 622	⚠	**ERD25FJ821**	Carbon, 820Ω, 1/4W, ± 5%
R623, 624		**ERG1ANJ822**	Metal Oxide, 8.2kΩ, 1W, ± 5%
R625, 626	⚠	**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R629, 630		**ERD25FJ823**	Carbon, 82kΩ, 1/4W, ± 5%
R631, 632	⚠	**ERD25FJ221**	Carbon, 220Ω, 1/4W, ± 5%
R633, 634	⚠	**ERD25FJ2R2**	Carbon, 2.2Ω, 1/4W, ± 5%
R635, 636	⚠	**ERD25FJ2R2**	Carbon, 2.2Ω, 1/4W, ± 5%
R637, 638	⚠	ERF3RKR47	Non-Flammable, 0.47Ω 3W, ±10%
R639, 640	⚠	ERF3RKR47	Non-Flammable, 0.47Ω 3W, ±10%
R641, 642	⚠	**ERD25FJ2R2**	Carbon, 2.2Ω, 1/4W, ± 5%
R643, 644	⚠	**ERD25FJ2R2**	Carbon, 2.2Ω, 1/4W, ± 5%
R645, 646	⚠	ERF3RKR47	Non-Flammable, 0.47Ω 3W, ±10%
R647, 648	⚠	ERF3RKR47	Non-Flammable, 0.47Ω 3W, ±10%
R649, 650		ERG2ANJ120	Metal Oxide, 12Ω, 2W, ± 5%
R651, 652		ERG2ANJ120	Metal Oxide, 12Ω, 2W, ± 5%
R653, 654		ERG2ANJ331	Metal Oxide, 330Ω, 2W, ± 5%
R655	⚠	ERQ2CJ391	Fuse Type Metallic, 390Ω, 2W, ± 5%
R656	⚠	ERQ2CJ331	Fuse Type Metallic, 330Ω, 2W, ± 5%
R657, 658	⚠	**ERD25FJ680**	Carbon, 68Ω, 1/4W, ± 5%
R659, 660	⚠	**ERD25FJ680**	Carbon, 68Ω, 1/4W, ± 5%
CAPACITORS			
C101, 102		ECCD1H820K	Ceramic, 82pF 50V, ±10%
C103, 104		ECKD1H821KB	Ceramic 820pF 50V, ±10%
C105, 106	⚠	**ECEA0JS222**	Electrolytic, 2200μF 6.3V
C107, 108		ECQP1473GZ	Polypropylene, 0.047μF 125V, ± 2%
C109, 110		ECQP1103GZ	Polypropylene, 0.01μF 125V, ± 2%
C111, 112		ECQM1H332JZ	Polyester, 0.0033μF 50V, ± 5%
C113, 114		**ECEA25N3R3**	Non-polar Electrolytic, 3.3μF, 25V
C115, 116		ECQM1H472JZ	Polyester, 0.0047μF 50V, ± 5%
C117		**ECEA1HS100**	Electrolytic, 10μF 50V
C118		ECKD1H103MD	Ceramic, 0.01μF 50V, ±20%
C119, 120		**ECEA1AS470**	Electrolytic, 47μF 10V
C121		**ECEA50Z1**	Electrolytic, 1μF 50V
C201, 202		**ECEA50M1R**	Electrolytic, 1μF 50V
C203, 204		ECQM1H392KZ	Polyester, 0.0039μF 50V, ±10%
C205, 206		ECQM1H393KZ	Polyester, 0.039μF 50V, ±10%
C207, 208		**ECEA50Z2R2**	Electrolytic, 2.2μF 50V
C209, 210		ECQM1H183KZ	Polyester, 0.018μF 50V, ±10%
C211, 212		ECQM1H154KZ	Polyester, 0.15μF 50V, ±10%
C213, 214		ECCD1H220K	Ceramic, 22pF 50V, ±10%
C215, 216	⚠	**ECEA25N3R3**	Non-polar Electrolytic, 3.3μF, 25V
C217, 218		ECCD1H390K	Ceramic, 39pF 50V, ±10%
C219, 220	⚠	**ECEA50NR47**	Non-polar Electrolytic, 0.47μF, 50V
C221, 222		ECQE1105N13	Polyester, 1μF 125V, ±10%
C223, 224		ECQE1105N13	Polyester, 1μF 125V, ±10%
C225, 226		ECQM1H473KZ	Polyester, 0.047μF 50V, ±10%
C227, 228		ECQM1H473KZ	Polyester, 0.047μF 50V, ±10%
C229, 230	⚠	**ECEA25N3R3**	Non-polar Electrolytic, 3.3μF, 25V
C231, 232	⚠	**ECEA25N3R3**	Non-polar Electrolytic, 3.3μF, 25V
C233, 234	⚠	**ECEA50NR47**	Non-polar Electrolytic, 0.47μF, 50V

Ref. No.		Part No.	Part Name & Description
C251, 252		ECQM1H153KZ	Polyester, 0.015μF, 50V, ±10%
C253, 254		ECQM1H183KZ	Polyester, 0.018μF, 50V, ±10%
C255, 256		ECQM1H124KZ	Polyester, 0.12μF, 50V, ±10%
C257, 258		ECQM1H124KZ	Polyester, 0.12μF, 50V, ±10%
C259, 260		ECCD1H181K	Ceramic, 180pF, 50V, ±10%
C301, 302		ECCD1H220K	Ceramic, 22pF, 50V, ±10%
C303, 304		ECKD1H821KB	Ceramic, 820pF, 50V, ±10%
C305, 306		ECCD1H150K	Ceramic, 15pF, 50V, ±10%
C401, 402		ECKDKC103PF	Ceramic, 0.01μF, 400VAC, $^{+100}_{-0}$%
C403		ECKDKC103PF	Ceramic, 0.01μF, 400VAC, $^{+100}_{-0}$%
C405, 406		ECET71R103Y	Electrolytic, 10000μF, 71V
C407, 408		ECET71R103Y	Electrolytic, 10000μF, 71V
C451, 452		**ECEA2AS4R7**	Electrolytic, 4.7μF, 100V
C453, 454		**ECEA1JS330**	Electrolytic, 33μF, 50V

Ref. No.		Part No.	Part Name & Description
C457, 458		**ECEA1ES101**	Electrolytic, 100μF, 25V
C459		**ECEA1CS330**	Electrolytic, 33μF, 16V
C460		ECKD1H102MD	Ceramic, 0.001μF, 50V, ±20%
C551		ECKD1H102MD	Ceramic, 0.001μF, 50V, ±20%
C552		**ECEA50Z3R3**	Electrolytic, 3.3μF, 50V
C553		ECEA16N220V	Non-Polar Electrolytic, 220μF, 16V
C554		**ECEA1CS330**	Electrolytic, 33μF, 6.3V
C601, 602		ECKD1H103MD	Ceramic, 0.01μF, 50V, ± 20%
C603, 604		ECKD1H103MD	Ceramic, 0.01μF, 50V, ± 20%
C609, 610		**ECEA2AS100**	Electrolytic, 10μF, 100V
C611, 612		ECQM1H104KZ	Polyester, 0.1μF, 50V, ± 10%
C615, 616		ECKD1H681KB	Ceramic, 680pF, 50V, ± 10%
C617, 618		ECKD1H681KB	Ceramic, 680pF, 50V, ± 10%
C619, 620		ECQM1H104KZ	Polyester, 0.1μF, 50V, ± 10%

Printed in Japan
80057800 A Y.K.